企业简介
COMPANY BRIEF INTRODUCTION

OHSAS 18001 认证 — 18001 certification
ISO 14001 认证 — ISO14001 certification
ISO 9001 认证 — ISO19001 certification
闽制00000135号 — Min Zhi 00000135
闽量机764号 — M.L.J No. 764

Ex NEPSI 证号: GYB071124 — Certificate No.: GYB071124
Ex NEPSI 证号: GYB071020 — Certificate No.: GYB071020
专利产品 仿冒必纠
专利号：200620051170.3
Patented product(s), counterfeiting not allowed
Patent No.: 200620051170.3
CQFB 证号: 32007826 — Certificate No.: 32007826
WIT ASSESSMENT 证号: 15/06Q5909R11 — Certificate No.: 15/06Q5909R11
注册号：01406S10053R0S
注册号：01406S10053R0S

提供解决方案，我们全力以赴！
We do our best to provide favorable solutions!

开发/生产/测试产品的科博工厂已取得ISO9001国际质量管理体系认证、ISO14001国际环境管理标准体系认证和OHS18001国际职业安全卫生管理体系认证。

With business scope of production development/production/testing, Kebo has obtained ISO9001 international quality management system certification, ISO14001 international environmental management standard system certification and OHS18001 international occupational health and safety management system certification.

福建恒劲科博测控技术有限公司是一家专业生产流体测控仪表、工业变送器及其软件的高新科技型企业。公司拥有一支高素质的员工队伍及现代专业的生产与测试试验设备，并拥有国家计量权威机构考核认证的流量测试校准装置，是福建省当前唯一一家通过国家级认证的流量检定站，是《靶式流量计》行业检定规程起草单位。

恒劲科博具备雄厚的技术力量、精良的设备、先进的检测手段、精湛的生产工艺、规范科学的管理，以ISO9001和OHS18001管理体系对产品实现的全过程进行监控、组织生产。

科博专业生产的流量测量仪表已形成十大系列，三百多个品种规格智能电磁流量计、智能靶式流量计系列、智能插入式流量计系列、一体化孔板流量计、智能涡街流量计系列、智能压力变送器、智能流量积算控制仪系列、电量变送器隔离器系列、流量远程监控系统软件、电流信号在线监控仪。产品广泛应用于水资源、造纸、化纤、化工、石油、电力、冶金、环保、食品、制药、路政建设等计量和自动化控制系统。

公司产品的性能稳定、可靠、安全，其专业素质和精神深受内界好评，并取得了多项检测合格和认证考评，科博将致力于工业过程流体测控产品的研发、制造、销售。我们秉承“质量为根、诚信为本”的经营理念，缔造流量测控品牌。建立“以顾客为中心、科学管理、追求零缺陷”的质量方针，用心去经营科博的事业，为客户提供全程、全方位服务的宗旨，为广大客户提供专业的技术支持与优良的服务。

Fujian Hengjin Kebo Measurement & Control Co., Ltd. is a high-tech technology-based enterprise specially producing fluid measurement and control instrument, industrial transmitter and their softwares. The Company has a team of high-quality employees and modern, professional production and testing equipment, as well as flow measurement and calibration devices assessed and authenticated by the national measurement authority. It is currently the only flow verification station with national-level certification in Fujian and has the honor to be a drafting unit of the Target Flowmeter industrial verification regulations.

Hengjin Kebo provides strong technical force, sophisticated equipment, advanced testing methods, skilled production technologies, and normative scientific management to supervise the whole process of product realization and organize production in accordance with ISO9001 and OHS18001 management systems.

Kebo's professional flow measurement instruments have formed ten series with more than 300 varieties and specifications, including intelligent electromagnetic flowmeter, intelligent target flowmeter, intelligent insert-type flowmeter series, integrated orifice plate flowmeter, intelligent vortex shedding flowmeter series, intelligent pressure transmitter, intelligent flow totalizer series, electrical isolation transmitter series, flow remote monitoring system software, and current signal online monitor. Such products are widely applied in measurement and automatic control systems of such fields as water resource, papermaking, chemical fiber, chemical industry, petroleum, electricity, metallurgy, environmental protection, food, pharmacy and highway construction.

The Company provides stable, reliable and safe product performance and is well acclaimed in the industry for its professional quality and spirits. With a number of test inspections and certification assessments, Kebo will continuously be committed to R&D, manufacture and sales of flow measurement and control products during industrial processes. In the principle of "quality and honesty as foundation", we strive for establishing a brand in flow measurement and control. We formulate the quality policy of "customer-centric, scientific management and zero defect", make diligent efforts for Kebo's development, aim for full and all-round service and provide professional technical support and excellent service for customers.

企业资质 QUALIFICATION

目录 Table of contacts

一 TGF智能靶式流量计

智能靶式管道型流量计		Intelligent target pipe-type flowmeter	
公称通径	10～300mm	Nominal diameter	10～300mm
公称压力	0.6～42MPa	Nominal pressure	0.6～42MPa
介质温度	-196℃～450℃	Medium temperature	-196℃～450℃
精度等级	±0.2%；±0.5%；±1.0%	Accuracy class	±0.2%；±0.5%；±1.0%
量程范围	1:3；1:5；1:10	Scale range	1:3；1:5；1:10
壳体材质	304；316L；工程塑料；碳钢	Housing material	304; 316L; engineering plastics; carbon steel
工作电压	内置3.6VDC锂电，24VDC	Working voltage	Built-in 3.6VDC lithium battery, 24VDC
输出信号	4-20mA;4-20mA+HART;脉冲(Pulse);RS485	Output signal	4-20mA;4-20mA+HART; Pulse;RS485
适用介质	液体；气体；蒸汽	Applicable medium	Liquid; gas; steam
安装结构	管道法兰式、对夹式、管锥螺纹	Installation structure	Pipe flange type, wafer type, taper pipe thread
防爆等级	本安型Exia Ⅱ CT4；隔爆型Exd Ⅱ CT4	Anti-explosion class	Intrinsic safety Exia Ⅱ CT4; explosion-proof type Exd Ⅱ
执行标准	Q/HJKB001-2014	Execution standard	Q/HJKB001-2014

保温夹套型智能靶式流量计		Heating jacket type intelligent target flowmeter	
公称通径	15~300mm	Nominal diameter	15~300mm
公称压力	0~42MPa	Nominal pressure	0~42MPa
介质温度	-196℃～450℃	Medium temperature	-196℃～450℃
精度等级	0.2；0.5；1.0	Accuracy class	0.2；0.5；1.0
量程范围	1:3；1:5；1:10	Scale range	1:3；1:5；1:10
壳体材质	碳钢；304；316L	Housing material	Carbon steel; 304; 316L
工作电压	内置3.6VDC锂电，24VDC	Working voltage	Built-in 3.6VDC lithium battery, 24VDC
输出信号	4-20mA;4-20mA+HART;脉冲;RS485	Output signal	4-20mA;4-20mA+HART; Pulse;RS485
适用介质	液体；气体；蒸汽	Applicable medium	Liquid; gas; steam
防护等级	IP65；IP67；IP68	IP grade	IP65；IP67；IP68
防爆等级	本安型Exia Ⅱ CT4；隔爆型Exd Ⅱ CT4	Anti-explosion class	Intrinsic safety Exia Ⅱ CT4; explosion-proof type Exd Ⅱ
执行标准	Q/HJKB001-2014	Execution standard	Q/HJKB001-2014

温压补偿型靶式流量计		Temperature and pressure compensation type target flowmeter	
公称口径	10～300mm	Nominal diameter	10～300mm
公称压力	0.6～42MPa	Nominal pressure	0.6～42MPa
介质温度	-196℃～450℃	Medium temperature	-196℃～450℃
精度等级	0.2；0.5；1.0	Accuracy class	0.2；0.5；1.0
量程范围	1:3；1:5；1:10	Scale range	1:3；1:5；1:10
壳体材质	碳钢；304；316L	Housing material	Carbon steel; 304; 316L
工作电压	内置3.6VDC锂电，24VDC	Working voltage	Built-in 3.6VDC lithium battery, 24VDC
输出信号	4-20mA;4-20mA+HART;脉冲;RS485	Output signal	4-20mA;4-20mA+HART; Pulse;RS485
适用介质	液体；气体；蒸汽	Applicable medium	Liquid; gas; steam
补偿方式	温度、压力	Compensation method	Temperature, pressure
防护等级	IP65；IP67；IP68	IP grade	IP65；IP67；IP68
防爆等级	本安型Exia Ⅱ CT4；隔爆型Exd Ⅱ CT4	Anti-explosion class	Intrinsic safety Exia Ⅱ CT4; explosion-proof type Exd Ⅱ
执行标准	Q/HJKB001-2014	Execution standard	Q/HJKB001-2014

夹装式智能靶式流量计		Clamp-on type intelligent target flowmeter	
公称口径	100～3000mm	Nominal diameter	100～3000mm
公称压力	0.6～26MPa	Nominal pressure	0.6～26MPa
介质温度	-196℃～450℃	Medium temperature	-196℃～450℃
精度等级	±0.5%；±1.0%；±1.5%	Accuracy class	±0.5%；±1.0%；±1.5%
量程范围	1:10 1:15	Scale range	1:10 1:15
壳体材质	304；316L	Housing material	304; 316L
工作电压	内置3.6VDC锂电，24VDC	Working voltage	Built-in 3.6VDC lithium battery, 24VDC
输出信号	4-20mA;4-20mA+HART;脉冲;RS485	Output signal	4-20mA;4-20mA+HART; Pulse;RS485
适用介质	液体；气体；蒸汽	Applicable medium	Liquid; gas; steam
补偿方式	温度、压力	Compensation method	Temperature, pressure
防护等级	IP65；IP67；IP68	IP grade	IP65；IP67；IP68
防爆等级	本安型Exia Ⅱ CT4；隔爆型Exd Ⅱ CT4	Anti-explosion class	Intrinsic safety Exia Ⅱ CT4; explosion-proof type Exd Ⅱ
执行标准	Q/HJKB001-2014	Execution standard	Q/HJKB001-2014

插入式智能靶式流量计		Insert type intelligent target flowmeter	
公称口径	100～3000mm	Nominal diameter	100～3000mm
公称压力	0.6～26MPa	Nominal pressure	0.6～26MPa
介质温度	-196℃～450℃	Medium temperature	-196℃～450℃
精度等级	±0.5%；±1.0%；±1.5%	Accuracy class	±0.5%；±1.0%；±1.5%
量程范围	1:10 1:15	Scale range	1:10 1:15
壳体材质	304；316L	Housing material	304; 316L
工作电压	内置3.6VDC锂电，24VDC	Working voltage	Built-in 3.6VDC lithium battery, 24VDC
输出信号	4-20mA;4-20mA+HART;脉冲;RS485	Output signal	4-20mA;4-20mA+HART; Pulse;RS485
适用介质	液体；气体；蒸汽	Applicable medium	Liquid; gas; steam
补偿方式	温度、压力	Compensation method	Temperature, pressure
防护等级	IP65；IP67；IP68	IP grade	IP65；IP67；IP68
防爆等级	本安型Exia Ⅱ CT4；隔爆型Exd Ⅱ CT4	Anti-explosion class	Intrinsic safety Exia Ⅱ CT4; explosion-proof type Exd Ⅱ
执行标准	Q/HJKB001-2014	Execution standard	Q/HJKB001-2014

在线可伸缩型智能靶式流量计		Online telescopic intelligent target flowmeter	
公称口径	100～3000mm	Nominal diameter	100～3000mm
公称压力	0.6～16MPa	Nominal pressure	0.6～16MPa
介质温度	-196℃～450℃	Medium temperature	-196℃～450℃
精度等级	±1.0%；±1.5%	Accuracy class	±1.0%；±1.5%
量程范围	1:10 1:15	Scale range	1:10 1:15
壳体材质	304；316L	Housing material	304; 316L
工作电压	内置3.6VDC锂电，24VDC	Working voltage	Built-in 3.6VDC lithium battery, 24VDC
输出信号	4-20mA;4-20mA+HART;脉冲;RS485	Output signal	4-20mA;4-20mA+HART; Pulse;RS485
适用介质	液体；气体；蒸汽	Applicable medium	Liquid; gas; steam
补偿方式	温度、压力	Compensation method	Temperature, pressure
防护等级	IP65；	IP grade	IP65
防爆等级	本安型Exia Ⅱ CT4；隔爆型Exd Ⅱ CT4	Anti-explosion class	Intrinsic safety Exia Ⅱ CT4; explosion-proof type Exd Ⅱ
执行标准	Q/HJKB001-2014	Execution standard	Q/HJKB001-2014

螺纹型智能靶式流量计		Thread type intelligent target flowmeter	
公称口径	10~50mm	Nominal diameter	10~50mm
公称压力	0.6～26MPa	Nominal pressure	0.6～26MPa
介质温度	-196℃～450℃	Medium temperature	-196℃～450℃
精度等级	±0.5%；±1.0%；±1.5%	Accuracy class	±0.5%；±1.0%；±1.5%
量程范围	1:10 1:15	Scale range	1:10 1:15
壳体材质	304；316L	Housing material	304; 316L
工作电压	内置3.6VDC锂电，24VDC	Working voltage	Built-in 3.6VDC lithium battery, 24VDC
输出信号	4-20mA;4-20mA+HART;脉冲;RS485	Output signal	4-20mA;4-20mA+HART; Pulse;RS485
适用介质	液体；气体；蒸汽	Applicable medium	Liquid; gas; steam
补偿方式	温度、压力	Compensation method	Temperature, pressure
防护等级	IP65；IP67；IP68	IP grade	IP65；IP67；IP68
防爆等级	本安型Exia Ⅱ CT4；隔爆型Exd Ⅱ CT4	Anti-explosion class	Intrinsic safety Exia Ⅱ CT4; explosion-proof type Exd Ⅱ
执行标准	Q/HJKB001-2014	Execution standard	Q/HJKB001-2014

卡箍型智能靶式流量计		Hoop type intelligent target flowmeter	
公称口径	10~100mm	Nominal diameter	10~100mm
公称压力	0.6～26MPa	Nominal pressure	0.6～26MPa
介质温度	-196℃～450℃	Medium temperature	-196℃～450℃
精度等级	±0.5%；±1.0%；±1.5%	Accuracy class	±0.5%；±1.0%；±1.5%
量程范围	1:10 1:15	Scale range	1:10 1:15
壳体材质	304；316L	Housing material	304; 316L
工作电压	内置3.6VDC锂电，24VDC	Working voltage	Built-in 3.6VDC lithium battery, 24VDC
输出信号	4-20mA;4-20mA+HART;脉冲;RS485	Output signal	4-20mA;4-20mA+HART; Pulse;RS485
适用介质	液体；气体；蒸汽	Applicable medium	Liquid; gas; steam
补偿方式	温度、压力	Compensation method	Temperature, pressure
防护等级	IP65；IP67；IP68	IP grade	IP65；IP67；IP68
防爆等级	本安型Exia Ⅱ CT4；隔爆型Exd Ⅱ CT4	Anti-explosion class	Intrinsic safety Exia Ⅱ CT4; explosion-proof type Exd Ⅱ
执行标准	Q/HJKB001-2014	Execution standard	Q/HJKB001-2014

(1) 概述 Overview

TGF智能靶式流量计是应用单剪切梁式力感应测量工作原理，通过力感应传感器测量应力变量并结合机电一体化测量技术，经高精度的传感器获取与流量一致的信号，此信号经高精度A/D转换器、微处理器CPU、D/A转换器等处理运算。输出现场液晶显示或4~20mA（HART、脉冲、RS485等）实现工况流量过程计量测控。测量管内接触流体无可动部件，测量精度可以与容积、质量流量计相媲美，同时还具备抗震、抗杂质的特性，特别是应用于高粘度、低雷诺数流体测量，效果极佳。其广泛应用于水资源、石油、化工、冶金、食品、造纸、环保、制药、纺织、路政建设等领域。

根据安装连接方式分为管道法兰型、对夹型、管锥螺纹型、插入型四大类。

根据应用工况分为常规普通型、高温型、低温型、温压补偿型、夹套保温型、在线可伸缩型、食品制药卫生型。

根据显示方式分为现场显示型（一体化型）和远传显示型（分体型）两种结构。

根据防爆场合分为隔爆型、本安型和普通型三种结构。

TGF intelligent target flowmeter operates with the principle of single-shear-beam type force sensing measurement, where with force sensor for measurement of stress variable and with mechatronics measuring technique, the signal consistent with flow rate is obtained by high-precision sensor and processed and calculated through A/D converter, microprocessor CPU, D/A converter, etc. Output site LCD or 4~20 mA (HART, pulse, RS485, etc.) achieves process measurement and control of flow rate in working conditions. Measurement pipe has no internal movable components contacting with fluid, has measurement accuracy comparable with volumetric, mass flowmeters, and meanwhile features earthquake proof and inclusion proof designs, especially for measurement of high-viscosity, low-Reynolds number fluid, providing excellent performance. It is widely applied in such fields as water resource, petroleum, chemical industry, metallurgy, food, papermaking, environmental protection, pharmacy, textile and highway construction.

According to installation connection methods, it may be classified into flange type, wafer type, taper pipe thread type and insert type.

According to application working conditions, it is classified into ordinary type, high-temperature type, low-temperature type, temperature and pressure compensation type, heating jacket type, online telescopic type and food pharmaceutical health type.

According to display modes, it is classified into site display type (integrated one) and remote display type (separate one).

According to explosion-proof occasions, it is classified into three structures, i.e. explosion-proof type, intrinsic safety and ordinary type.

(2) 工作原理 Operating principle

TGF智能靶式流量计工作原理是在测量管本体内中心轴位设置一受力部件靶体，当流体流动质点冲击靶体，靶体受到一个力F，其与流体密度ρ、靶体受力面积S、流速v的平方成正比的电信号，其关系式如下。

The operating principle of TGF intelligent target flowmeter is to set a stressed member as target at the central axis position of measuring pipe itself; when fluid flow particles impact the target, the target will be stressed by a force F which is an electric signal in direct proportion to the square of fluid density ρ, target stressed area S and flow velocity v.

$$F=\delta\rho S\frac{V^2}{2g} \quad \text{----------(1)}$$

F：靶体上所受的作用力(the force acting on the target, kgf)，kgf；
δ：阻力系数(drag coefficient)；
ρ：流体工况密度(fluid density in working conditions), kg/m³
S：靶体受力面积(target stressed area)，m²
V：工况流体流速(fluid flow velocity in working conditions)，m/s
g：9.80665

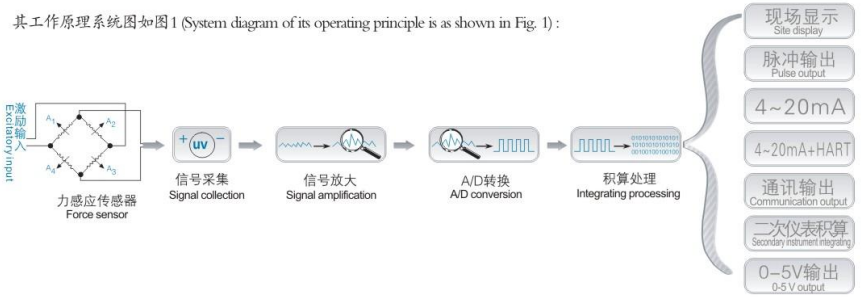
经数学推导换算，得到流量公式如下(Flow formula is as follows after mathematical deduction and conversion)：

$$q_m=14.129\alpha D\left(\frac{1}{\beta}-\beta\right)\sqrt{\rho F} \quad \text{kg/h} \quad \text{----------(2)}$$

$$q_V=14.129\alpha D\left(\frac{1}{\beta}-\beta\right)\sqrt{\frac{F}{\rho}} \quad \text{m³/h} \quad \text{----------(3)}$$

中(Where) qm，qv---分别为质量流量和体积流量(mass flow and volumetric flow respectively)，kg/h，m³/h；
A---流量系数(flow coefficient)；
D---测量管内径(internal diameter of measuring pipe)，mm
B---流隙比(flow gap ratio)，β=d/D
D---靶体直径(target diameter)，mm（非圆形靶体可换算成圆直径for non round targets, it can be converted to diameter of round target）
其它符号意同上式(Meanings of other symbols are the same to those in the formula above)。
靶体受力经应力感应传感器转换成微伏电信号，经前置放大、A/D转换、经CPU计算机运算处理后，得到相应的流速和流量。
Target stress is converted by stress sensor to microvolt signal and the corresponding flow velocity and flow rate are obtained after pre-amplification, A/D conversion and CPU computer processing.

其工作原理系统图如图1(System diagram of its operating principle is as shown in Fig. 1)：



(3) 性能特征 Performance characteristic

适用于工况流体（液体、气体、蒸汽）温度-200°C~+450°C范围工作可选；
测量应用范围宽，相对最大测量量程比可达1:50；
测量准确度高，可达0.2%R；
测量灵敏度高，相对测量最低流速达60mm/s；
测量响应速度快，重复性好；
结构紧固、抗腐蚀、无可动部件，使用寿命长；
现场可采用砝码挂重法标定校准，给用户周期校验带来方便；
可根据工况实际需要更换靶体（即改变受力面积），改变量程测量范围；
可实现现场读值，且能远传输出及与PC机远程操控；
安装简单，维护方便，特别是口径大于300mm，更为方便。

Applicable for working fluid (liquid, gas and steam), with optional temperature -200°C~+450°C;
Wide measurement application scope, maximum measurement span ratio being 1:50;
High accuracy of measurement, up to 0.2%R;
High measuring sensitivity, minimum relative flow velocity of measurement being 60 mm/s;
Quick measurement response and favorable repeatability;
Structure fastened and corrosion resistant, without movable components, and with long service life;
Available site weight hanging method for calibration, convenient for users' periodic verification;
Allowed to change target (i.e. change stressed area) and change measurement span based on actual working conditions;
Allowed for site reading and remote transmission output and remote control by PC;
Easy installation and convenient maintenance, especially for caliber larger than 300 mm.

(4) 参数及指标

恒劲科博 始终致力于其产品功能的改进工作，基于该原因，产品技术规格也会受到更改，如遇上述情况，恕不另行通知。

公称通径	法兰型10～600mm	对夹型10～600mm	管锥螺纹式10～80mm	插入型100～2000mm
公称压力	0.6～42MPa			
适应工况温度	−200℃～+450℃			
精 确 度	±0.2%	±0.5%	±1.0%	±1.5%	±1.5%
量 程 比	1：5	1：10	1：10	1：10(气体)	1：15(蒸汽)
阻尼时间	0~3.9s			
不重复性	≤0.10%R.O			
工作电压	内置 3.6V锂电池、外供24VDC			
信号输出方式	现场液晶显示；脉冲；4～20mA(二线制）或HATR协议；RS485；Modbus（可选）			
测量管本体材质	304；316L；内衬；碳钢；工程合金塑料，亦可根据客户要求提供			
防爆标志	本安型(ExiaIICT1~4)；隔爆型 (ExdIICT1~5)；隔爆型ExdⅠ（煤矿场所）			
防护等级	IP65；IP67；IP68			
产品执行标准	Q/HJKB001−2014			
连接法兰规格	执行GB/T9113~9131−2000系列法兰标准或按客户要求提供			

(4) Parameter and indexes

Hengjin Kebo has always been committed to improvement of its product functions. Therefore, product technical specifications are subject to change without further notice.

Nominal diameter	Flange type 10~600 mm	Wafer type 10~600 mm	Taper pipe thread 10~80 mm	Insert type 100~2000 mm
Nominal pressure	0.6～42MPa			
Acceptable working temperature	−200℃～+450℃			
Accuracy	±0.2%	±0.5%	±1.0%	±1.5%	±1.5%
Span ratio	1：5	1：10	1：10	1:10 (gas)	1:15 (steam)
Damping time	0~3.9s			
Non−repeatability	≤0.10%R.O			
Working voltage	Build−in 3.6V lithium battery, external power supply 24VDC			
Signal output method	Site LCD; pulse; 4~20mA (two−wire system) or HART protocol; RS485; Modbus (optional)			
Material of measuring pipe itself	304; 316L; lining; carbon steel; either alloy engineering plastics, or otherwise supplied according to demands of customers			
Explosion−proof mark	Intrinsic safety (Exia II CT1~4); explosion−proof type (Exd II CT1~5); explosion−proof type Exd I (coal mine site)			
IP grade	IP65；IP67；IP68			
Product executive standard	Q/HJKB001−2014			
Connecting flange specification	Subject to GB/T9113~9131−2000 series flange standards or otherwise provided according to demands of customers			

(5) 选型编码说明 Description of selection coding

TGF	靶式流量计 Target flowmeter

代号 Code	公称通径 Nominal diameter
0010	DN10
⋮	
1000	DN1000
⋮	
3000	DN3000

代号 Code	安装方式 Installation mode
D	对夹型 Wafer type
F	法兰型 Flange type
J	插入型 Insert type
K	可伸型(在线可拆装式）Telescopic type (online demountable type)
L	管锥螺纹型 Taper pipe thread type
H	卫生型 Health type

代号 Code	公称压力 Nominal pressure	代号 Code	公称压力 Nominal pressure
A	0.6MPa	L	16MPa
B	1.0MPa	M	20MPa
C	1.6MPa	N	25MPa
D	2.0MPa	O	26MPa
E	2.5MPa	P	42MPa
F	4.0MPa		
G	5.0MPa		
H	6.3MPa		
I	10MPa		
J	11MPa		
K	15MPa		

代号 Code	壳体材质 Housing material
B	不锈钢 Stainless steel
C	内衬 Lining
T	碳钢 Carbon steel
G	工程合金塑料 Alloy engineering plastics

代号 Code	防爆标示 Explosion-proof mark
B	本安型 Ⅱ类 Intrinsic safety Exia II
G	隔爆型 Ⅱ类 Explosion-proof type Exd II
M	隔爆型 Ⅰ类 Explosion-proof type Exd I
P	普通型 Ordinary type

代号 Code	输出方式 Output method
E	二次仪表 Secondary instrument
L	4～20mA(二线制）4~20mA (two-wire system)
H	4～20mA+HART协议 4~20mA+HART protocol
R	MODBUS通讯协议 MODBUS communication protocol
M	脉冲发信 Pulse transmitting
T	通讯输出 RS485 Communication output RS485
X	现场读值 Site reading
K	节点开关量 Node switch value
1	流量点报警输出 Alarm output of flow point
2	定量报警输出 Quantitative alarm output
G	工厂自定义 Factory custom

TGF 0100 F C B G T

TGF0100FCBGT含意为：靶式流量计；公称通径100mm；法兰型安装结构；公称压力1.6MPa；壳体材质为不锈钢；防爆标志为隔爆型；通讯RS485协议远传输出

TGF0100FCBGT means: target flowmeter; nominal diameter 100 mm; flange type installation structure; nominal pressure 1.6 MPa; housing material is stainless steel; explosion−proof sign is explosion−proof type; communication RS485 protocol for remote transmission output.

测量饱蒸和汽质量流量范围选型表

Selection table of flow rate range for measuring saturated steam mass

公称通径 Nominal diameter	0.1MPa	0.2MPa	0.3MPa	0.4MPa	0.5MPa	0.6MPa	0.7MPa	0.8MPa
DN15	1.8～18kg/h	2～30kg/h	3～40kg/h	6～75kg/h	7～90kg/h	8～95kg/h	9～105kg/h	10～115kg/h
DN20	2～25kg/h	5～60kg/h	8～100kg/h	10～120kg/h	12～140kg/h	15～160kg/h	18～190kg/h	20～220kg/h
DN25	4～60kg/h	8～100kg/h	12～140kg/h	18～195kg/h	20～240kg/h	25～270kg/h	27～300kg/h	29～340kg/h
DN32	7～90kg/h	15～160kg/h	20～250kg/h	30～360kg/h	35～380kg/h	40～480kg/h	45～520kg/h	50～580kg/h
DN40	10～180kg/h	22～260kg/h	34～410kg/h	42～490kg/h	48～560kg/h	60～720kg/h	75～800kg/h	84～920kg/h
DN50	18～220kg/h	28～390kg/h	50～450kg/h	65～760kg/h	80～960kg/h	0.1～1.2t/h	0.13～1.5t/h	0.16～1.8t/h
DN65	30～360kg/h	60～750kg/h	80～970kg/h	0.12～1.4t/h	0.16～1.9t/h	0.18～1.9t/h	0.21～2.4t/h	0.23～2.6t/h
DN80	50～650kg/h	85～980kg/h	0.14～1.6t/h	0.17～1.9t/h	0.2～2.4t/h	0.24～2.9t/h	0.28～3.2t/h	0.35～4.1t/h
DN100	60～850kg/h	0.1～1.6t/h	0.18～2.5kg/h	0.24～3.2t/h	0.3～4.0t/h	0.4～5.2t/h	0.5～6.0t/h	0.58～6.4t/h
DN125	0.105～1.3t/h	0.2～3.0t/h	0.3～4.30t/h	0.35～4.5t/h	0.4～5.10t/h	0.52～6.5t/h	0.6～7.20t/h	0.75～8.8t/h
DN150	0.16～2.2t/h	0.32～4.4t/h	0.4～5.2t/h	0.5～6.5t/h	0.6～7.5t/h	0.8～9.8t/h	0.9～10.2t/h	1.12～12.5t/h
DN200	0.25～3.4t/h	0.45～6.5t/h	0.80～10.5t/h	1.05～12.8t/h	1.4～15.6t/h	1.8～20.5t/h	2.0～28t/h	2.2～30t/h
DN250	0.45～5.0t/h	0.8～11t/h	1.3～15.5t/h	1.6～21t/h	1.8～25t/h	2.0～30t/h	2.4～36t/h	3.2～40t/h
DN300	0.60～9.0t/h	1.2～18t/h	1.8～22t/h	2.3～30t/h	2.8～36t/h	3.5～42t/h	4.2～53t/h	4.7～58t/h

公称通径 Nominal diameter	0.9MPa	1.0MPa	1.1MPa	1.2MPa	1.3MPa	1.4MPa	1.5MPa	1.6MPa
DN15	12～135kg/h	14～150kg/h	15～175kg/h	16～190kg/h	17～210kg/h	19～220kg/h	20～240kg/h	24～280kg/h
DN20	18～220kg/h	22～295kg/h	24～345kg/h	27～380kg/h	30～430kg/h	36～480kg/h	39～520kg/h	42～600kg/h
DN25	25～340kg/h	30～410kg/h	34～470kg/h	39～530kg/h	42～580kg/h	46～610kg/h	50～660kg/h	62～720kg/h
DN32	50～580kg/h	54～650kg/h	59～710kg/h	63～780kg/h	71～830kg/h	80～980kg/h	0.1～1.15t/h	0.13～1.5t/h
DN40	72～980kg/h	0.09～1.3t/h	0.12～1.6t/h	0.16～2.2t/h	0.19～2.7t/h	0.21～2.6t/h	0.22～2.8t/h	0.25～3.0t/h
DN50	0.09～1.2t/h	0.12～1.8t/h	0.16～1.9t/h	0.20～2.2t/h	0.23～2.5t/h	0.26～3.0t/h	0.30～3.3t/h	0.34～3.8t/h
DN65	0.11～1.4t/h	0.16～2.0t/h	0.18～2.2t/h	0.21～2.7t/h	0.25～3.2t/h	0.28～3.4t/h	0.31～3.5t/h	0.35～4.1t/h
DN80	0.18～2.6t/h	0.29～3.8t/h	0.35～3.8t/h	0.42～5.6t/h	0.50～6.8t/h	0.62～7.0t/h	0.65～7.5t/h	0.72～8.4t/h
DN100	0.27～3.5t/h	0.32～4.1t/h	0.38～4.5t/h	0.44～4.5t/h	0.52～6.0t/h	0.68～7.7t/h	0.75～8.5t/h	0.8～10t/h
DN125	0.35～5.4t/h	0.62～7.5t/h	0.8～8.6t/h	1.2～14t/h	1.5～18t/h	1.8～22t/h	2.2～25t/h	2.4～28t/h
DN150	0.9～11t/h	1.2～13t/h	1.4～15t/h	1.7～22t/h	1.8～24t/h	2.0～28t/h	2.2～30t/h	2.4～32t/h
DN200	1.30～15t/h	1.6～18t/h	1.8～22t/h	2.3～30t/h	2.8～36t/h	3.5～42t/h	4.2～53t/h	4.7～58t/h
DN250	2.6～32t/h	3.5～38t/h	3.8～41t/h	4.2～44t/h	4.5～48t/h	4.9～53t/h	5.2～65t/h	5.5～70t/h
DN300	3.8～42t/h	4.3～56t/h	4.7～63t/h	5.5～65t/h	6.2～72t/h	7.8～85t/h	8.5～98t/h	9.2～100t/h

测量气体体积流量范围选型表

Selection table of flow rate range for measuring gas volume

公称通径 Nominal diameter	标准状态流量 Flow rate in standard state		工况状态流量 Flow rate in working state	
	最小流量m³/h Min. flow rate (m³/h)	最大流量m³/h Max. flow rate (m³/h)	最小流量m³/h Min. flow rate (m³/h)	最大流量m³/h Max. flow rate (m³/h)
DN10	3.36k / $\sqrt{\rho}$	21.6k	3.36 / $\sqrt{\rho}$	21.6
DN15	5.04k / $\sqrt{\rho}$	31.8k	5.04 / $\sqrt{\rho}$	31.8
DN20	9k / $\sqrt{\rho}$	56.52k	9 / $\sqrt{\rho}$	56.52
DN25	14.04k / $\sqrt{\rho}$	88.2k	14.04 / $\sqrt{\rho}$	88.2
DN32	23.04k / $\sqrt{\rho}$	144.6k	23.04 / $\sqrt{\rho}$	144.6
DN40	36k / $\sqrt{\rho}$	226.2k	36 / $\sqrt{\rho}$	226.2
DN50	56.22k / $\sqrt{\rho}$	353.4k	56.22 / $\sqrt{\rho}$	353.4
DN65	95.076k / $\sqrt{\rho}$	597k	95.076 / $\sqrt{\rho}$	597
DN80	144.018k / $\sqrt{\rho}$	906k	144.018 / $\sqrt{\rho}$	906
DN100	225.03k / $\sqrt{\rho}$	1416k	225.03 / $\sqrt{\rho}$	1416
DN125	351.612k / $\sqrt{\rho}$	2208k	351.612 / $\sqrt{\rho}$	2208
DN150	506.31k / $\sqrt{\rho}$	3180k	506.31 / $\sqrt{\rho}$	3180
DN200	900.12k / $\sqrt{\rho}$	5652k	900.12 / $\sqrt{\rho}$	5652
DN250	1406.4k / $\sqrt{\rho}$	8838k	1406.4 / $\sqrt{\rho}$	8838
DN300	2025.3k / $\sqrt{\rho}$	12720k	2025.3 / $\sqrt{\rho}$	12720
DN350	2756.58k / $\sqrt{\rho}$	17316k	2756.58 / $\sqrt{\rho}$	17316
DN400	3600.48k / $\sqrt{\rho}$	22620k	3600.48 / $\sqrt{\rho}$	22620
DN500	5625.72k / $\sqrt{\rho}$	35340k	5625.72 / $\sqrt{\rho}$	35340
DN600	8101.2k / $\sqrt{\rho}$	50892k	8101.2 / $\sqrt{\rho}$	50892
DN700	11026.2k / $\sqrt{\rho}$	69240k	11026.2 / $\sqrt{\rho}$	69240
DN800	14401.8k / $\sqrt{\rho}$	90480k	14401.8 / $\sqrt{\rho}$	90480
DN900	18277.2k / $\sqrt{\rho}$	114480k	18277.2 / $\sqrt{\rho}$	114480
DN1000	22503k / $\sqrt{\rho}$	141360k	22503 / $\sqrt{\rho}$	141360

ρ ——状态下气体的密度kg/m³

$k=\frac{P+0.101325}{0.101325}$

P 工作压力（表压）Mpa

t 介质温度

P -- gas density in the state (kg/m³)

$k--\frac{P+0.101325}{0.101325}$

ρ -- working pressure (gage pressure) Mpa

t -- medium temperature

测量过热蒸汽质量流量范围选型表

Selection table of flow rate range for measuring overheated steam mass

最小流量m³/h Min. flow rate (m³/h)	最大流量m³/h Max. flow rate (m³/h)
3.857 × $\sqrt{\rho}$	19.38 × ρ
5.063 × $\sqrt{\rho}$	25.45 × ρ
9.126 × $\sqrt{\rho}$	45.85 × ρ
14.063 × $\sqrt{\rho}$	70.681 × ρ
23.043 × $\sqrt{\rho}$	115.8 × ρ
36.005 × $\sqrt{\rho}$	180.94 × ρ
56.257 × $\sqrt{\rho}$	282.73 × ρ
95.075 × $\sqrt{\rho}$	477.81 × ρ
144.02 × $\sqrt{\rho}$	723.77 × ρ
225.03 × $\sqrt{\rho}$	1130.9 × ρ
351.61 × $\sqrt{\rho}$	1767 × ρ
506.31 × $\sqrt{\rho}$	2544.5 × ρ
900.12 × $\sqrt{\rho}$	4523.6 × ρ
1406.4 × $\sqrt{\rho}$	7068.1 × ρ
2025.3 × $\sqrt{\rho}$	10178 × ρ
2756.6 × $\sqrt{\rho}$	13854 × ρ
3600.5 × $\sqrt{\rho}$	18094 × ρ
5625.7 × $\sqrt{\rho}$	28273 × ρ
8101 × $\sqrt{\rho}$	40712 × ρ
11026 × $\sqrt{\rho}$	55414 × ρ
14402 × $\sqrt{\rho}$	72378 × ρ
18227 × $\sqrt{\rho}$	91603 × ρ
22503 × $\sqrt{\rho}$	113090 × ρ

ρ ——状态下的过热蒸汽密度kg/m³

ρ ---Overheated steam density in the state (kg/m3)

本表适用于干式气体流量范围选型参考,口径大于DN1000时，流量范围需订货确认。

The table is applicable to reference of flow rate range for dry gases and for caliber larger than DN1000, confirmation of flow rate range order is required.

(6) 测量介质流量范围选型表 Selection table of flow rate range of measuring media

所有TGF系列靶式流量计的选型需经计算，把实际工况流量转换成等量标准水或空气的流量，再按其流量范围选择适合的型号。确切了解测量流体对象的实际参数，包括流体名称（组分），流量范围（最大、最小和常用流量），流体工作压力，温度，工作状态下密度，粘度，安装处管道直径，必要时允许的压力损失等。用户确定工艺操作条件参数后厂商可提供选型设计计算书。

Selection of all TGF series target flowmeters should be determined after calculation, that is to say, the actual working flow rate should be converted to an equivalent standard flow rate of water or air and its flow rate range is based on for selection. Besides, it is necessary to know actual parameters of fluid object to be measured, including name of fluid (composition), flow rate range (max., min. and normal flow rate), fluid working pressure, temperature, density and viscosity under working status, pipeline diameter at installation places, allowable pressure loss in necessity, etc. Manufacturer may provide selection design calculation sheet after users determine parameters of process conditions.

标准水状态下流量范围选型表
Selection table of flow rate range in standard water state

公称通径	q_{vmin}			q_{vmax}			满量程压降
	m^3/h	m/s	流隙比β	m^3/h	m/s	流隙比β	
10	0.04	0.14	0.920	2.8	9.90	0.500	92.65
15	0.08	0.13	0.933	6	9.43	0.467	62.42
20	0.12	0.11	0.925	9	7.96	0.463	28.87
25	0.2	0.11	0.920	15	8.49	0.460	19.36
32	0.5	0.17	0.875	25	8.63	0.438	13.18
40	0.8	0.18	0.850	44	9.73	0.425	7.25
50	1	0.14	0.850	50	7.07	0.425	4.48
65	2	0.17	0.785	100	8.37	0.392	3.26
80	3	0.17	0.750	150	8.29	0.375	1.05
100	4.5	0.16	0.700	225	7.96	0.350	0.82
125	6	0.14	0.680	300	6.79	0.340	0.57
150	10	0.16	0.600	500	7.86	0.300	0.25
200	18	0.16	0.510	900	7.96	0.255	0.16
250	25	0.14	0.480	1250	7.07	0.240	0.1
300	40	0.16	0.400	2000	7.86	0.200	0.08
350	50	0.14	0.371	2500	7.22	0.186	0.07
400	65	0.14	0.350	3250	7.18	0.175	0.05
500	110	0.16	0.290	5500	7.78	0.145	0.03
600	170	0.17	0.250	8500	8.35	0.125	0.01
700	230	0.17	0.229	11500	8.30	0.114	0.01
800	300	0.17	0.225	15000	8.29	0.113	≤0.01
900	370	0.16	0.222	18500	8.08	0.111	≤0.01
1000	470	0.17	0.220	23500	8.31	0.110	
1200	670	0.16	0.200	33500	8.23	0.100	
1400	900	0.16	0.179	45000	8.12	0.089	
1600	1200	0.17	0.175	60000	8.29	0.088	
1800	1500	0.16	0.167	75000	8.19	0.083	
2000	1850	0.16	0.160	92500	8.18	0.080	
2200	2000	0.15	0.164	100000	7.31	0.082	
2400	2500	0.15	0.167	125000	7.68	0.083	
2600	3000	0.16	0.162	150000	7.85	0.081	
2800	3500	0.16	0.161	175000	7.89	0.080	
3000	3800	0.15	0.167	190000	7.47	0.083	

★公称通径 Nominal diameter

★流隙比β Flow gap ratio β

★流隙比β Flow gap ratio β

★满量程压降 Full scale pressure drop

a.流隙比仅供设计选型参考;

b.本表适用于液体流量范围选型参考,流量低于q_{vmin}时，需特殊订货确认。

c.实际当前压降=$(\frac{\text{实际流量}}{\text{满刻度流量}})^2$X满量程压降

A. Flow gap ratio is only for design and selection reference;

B. The table is applicable to reference of liquid flow rate range selection and for flow rate lower than qvmin, special order confirmation is required

c. Actual current pressure drop = $(\frac{\text{Actual flow rate}}{\text{full scale flow rate}})^2$ × full scale pressure drop

测量液体体积流量范围选型表
Selection table of flow rate range for measuring liquid volume

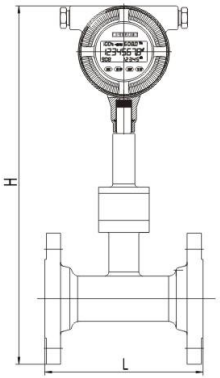
最小流量m³/h Min. flow rate (m³/h)	最大流量m³/h Max. flow rate (m³/h)
1.265 /√ρ	88.54377 /√ρ
2.530 /√ρ	189.7367 /√ρ
3.795 /√ρ	284.605 /√ρ
6.325 /√ρ	474.3416 /√ρ
15.811 /√ρ	790.5694 /√ρ
25.298 /√ρ	1391.402 /√ρ
31.623 /√ρ	1581.139 /√ρ
63.246 /√ρ	3162.278 /√ρ
94.868 /√ρ	4743.416 /√ρ
142.302 /√ρ	7115.125 /√ρ
189.737 /√ρ	9486.833 /√ρ
316.228 /√ρ	15811.39 /√ρ
569.210 /√ρ	28460.5 /√ρ
790.569 /√ρ	39528.47 /√ρ
1264.911 /√ρ	63245.55 /√ρ
1581.139 /√ρ	79056.94 /√ρ
2055.480 /√ρ	102774 /√ρ
3478.505 /√ρ	173925.3 /√ρ
5375.872 /√ρ	268793.6 /√ρ
7273.239 /√ρ	363661.9 /√ρ
9486.833 /√ρ	474341.6 /√ρ
11700.427 /√ρ	585021.4 /√ρ
14862.705 /√ρ	743135.3 /√ρ
21187.260 /√ρ	1059363 /√ρ
28460.499 /√ρ	1423025 /√ρ
37947.332 /√ρ	1897367 /√ρ
47434.165 /√ρ	2371708 /√ρ
58502.137 /√ρ	2925107 /√ρ
63245.553 /√ρ	3162278 /√ρ
79056.942 /√ρ	3952847 /√ρ
94868.330 /√ρ	4743416 /√ρ
110679.718 /√ρ	5533986 /√ρ
120166.551 /√ρ	6008328 /√ρ

ρ --状态下的流体密度kg/m³

ρ -- Fluid density in the state (kg/m³)

(7) 产品外形及连接尺寸 Product appearance and connection dimension

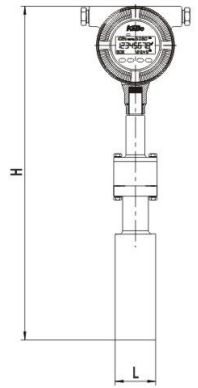
法兰管道型 Flange pipe type:



法兰管道型 Flange pipe type:

公称通径 Nominal diameter	L	H	常规产品连接法兰规格 Specifications of connection flanges of conventional products
DN10	200	405	1.6～4.0MPa
DN15	200	410	
DN20	200	415	
DN25	200	420	
DN32	200	430	
DN40	200	440	
DN50	200	450	
DN65	250	470	1.0~1.6MPa
DN80	250	485	
DN100	250	510	
DN125	300	545	
DN150	300	575	
DN200	350	635	1.6MPa
DN250	400	700	
DN300	500	760	
DN350	500	820	
DN400	500	875	
DN450	500	935	
DN500	500	1000	
DN600	500	1120	

对夹型 Wafer type:



对夹型 Wafer type:

公称通径 Nominal diameter	L	H	常规产品连接法兰规格 Specifications of connection flanges of conventional products
DN15～50	50	375~440	1.6～4.0MPa
DN65	80	450	1.0~1.6 或 2.5~4.0MPa
DN80	80	460	
DN100	80	485	
DN125	80	515	
DN150	80	540	
DN200	80	595	1.6或2.5MPa
DN250	80	650	
DN300	100	700	
DN350	100	760	1.6MPa
DN400	100	810	
DN500	100	940	
DN550	100	995	
DN600	100	1050	

①、高温型、超低温型、保温型、在线可伸缩型流量计的结构外形尺寸，以出厂或订货时确认为准。

②、常规产品连接法兰尺寸按GB/T9113～9131-2000 系列标准。

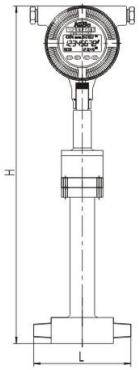
③、L、H尺寸仅供设计选型参考，以出厂或订货时确认为准。

① Structure dimensions of high-temperature type, super-low temperature type, thermal insulation type, online telescopic flowmeters are subject to the confirmation at the time of delivery or ordering.

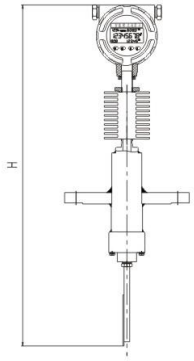
② Dimensions of connection flanges of conventional products are subject to GB/T9113~9131-2000 series.

③ L and H dimensions are only for design and selection reference and subject to the confirmation at the time of delivery or ordering.

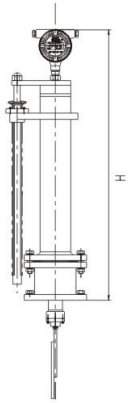
螺纹型
Thread type



插入型
Insert type



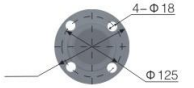
在线可伸缩型
Online telescopic type



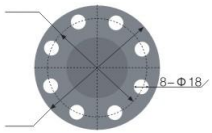
注：H、L以出厂订货确认为准
Note: H and L dimensions are subject to the confirmation at the time of delivery or ordering

螺纹型参数
Parameters of thread type

公称通径 Nominal diameter	L	H
DN10	150	370
DN15	150	370
DN20	150	370
DN25	150	370
DN32	200	380
DN40	200	390
DN50	200	395
DN65	200	410
DN80	200	430



流量计通径≤DN200时采用
DN50法兰标准短接附件安装
If flowmeter diameter is not larger than DN200, DN50 flange standard short accessories are adopted for installation



流量计通径＞DN200时采用
DN100法兰标准短接附件安装
If flowmeter diameter is larger than DN200, DN100 flange standard short accessories are adopted for installation

①、高温型、超低温型、保温型、在线可伸缩型流量计的结构外形尺寸，以出厂或订货时确认为准。
②、常规产品连接法兰尺寸按GB/T9113～9131–2000 系列标准。
③、L、H尺寸仅供设计选型参考，以出厂或订货时确认为准。

① Structure dimensions of high–temperature type, super–low temperature type, thermal insulation type, online telescopic flowmeters are subject to the confirmation at the time of delivery or ordering.
② Dimensions of connection flanges of conventional products are subject to GB/T9113–9131–2000 series.
③ L and H dimensions are only for design and selection reference and subject to the confirmation at the time of delivery or ordering.

二 VSF智能涡街流量计 VSF intelligent vortex shedding flowmeter

法兰连接型涡街流量计		Flange connecting type vortex shedding flowmeter	
公称口径	10–300mm	Nominal diameter	10–300mm
公称压力	0.6–42Mpa	Nominal pressure	0.6–42Mpa
介质温度	–40–350℃	Medium temperature	–40–350℃
精度等级	0.5;1.0;1.5;2.5	Accuracy class	0.5;1.0;1.5;2.5
量程范围	1:3;1:5;1:10	Scale range	1:3;1:5;1:10
壳体材质	碳钢；304；316L	Housing material	carbon steel；304；316L
工作电压	24VDC；220VAC	Working voltage	24VDC；220VAC
输出信号	4–20mA(两线制);脉冲;RS485;HART	Output signal	4–20mA(two–wire system); pulse;RS485;HART
防护等级	EP65;IP67;IP68	IP grade	EP65;IP67;IP68

温压一体式涡街流量计		Temperature–pressure integrated vortex shedding flowmeter	
公称口径	10–300mm	Nominal diameter	10–300mm
公称压力	0.6–42Mpa	Nominal pressure	0.6–42Mpa
介质温度	–40–350℃	Medium temperature	–40–350℃
精度等级	0.5;1.0;1.5;2.5	Accuracy class	0.5;1.0;1.5;2.5
量程范围	1:3;1:5;1:10	Scale range	1:3;1:5;1:10
壳体材质	碳钢；304；316L	Housing material	carbon steel；304；316L
工作电压	24VDC；220VAC	Working voltage	24VDC；220VAC
输出信号	4–20mA(两线制);脉冲;RS485;HART	Output signal	4–20mA(two–wire system); pulse;RS485;HART
防护等级	EP65;IP67;IP68	IP grade	EP65;IP67;IP68

夹装式涡街流量计		Clamp–on type vortex shedding flowmeter	
公称口径	10–300mm	Nominal diameter	10–300mm
公称压力	0.6–42Mpa	Nominal pressure	0.6–42Mpa
介质温度	–40–350℃	Medium temperature	–40–350℃
精度等级	0.5;1.0;1.5;2.5	Accuracy class	0.5;1.0;1.5;2.5
量程范围	1:3;1:5;1:10	Scale range	1:3;1:5;1:10
壳体材质	碳钢；304；316L	Housing material	carbon steel；304；316L
工作电压	24VDC；220VAC	Working voltage	24VDC；220VAC
输出信号	4–20mA(两线制);脉冲;RS485;HART	Output signal	4–20mA(two–wire system); pulse;RS485;HART
防护等级	EP65;IP67;IP68	IP grade	EP65;IP67;IP68

(1) 概述 Overview

VSF智能涡街流量计是采用先进的机电一体化微处理技术，它具备有与其他流量计不可兼得的优点。与孔板相比，它的测量范围广，压损小，安装、使用、维护方便经济。与涡轮流量计相比，它无可动部件，维护少，仪表系数稳定。特别是在耐高温、抗振动、微功耗处理等关键技术问题得到了历史性的突破。并结合现代高新机电一体化测控技术，采用高精度D/D放大转换器、进口微处理器CPU、D/A转换器等处理运算，输出现场液晶显示、脉冲、4~20mA、RS232/485、GPRS远程监控等强大的功能，实现现场工况流量计量和远程测控。

其广泛适用于封闭管道中的液体、气体、蒸汽的体积流量和质量流量的计量。

VSF intelligent vortex shedding flowmeter applies advanced mechatronics and micro processing technologies and features advantages that other flowmeters cannot have simultaneously. Compared with pore plate, it has wide measurement range, low loss of pressure, and convenient and economic installation, use and maintenance. Compared with turbine flowmeter, it has no movable component, less maintenance and stable instrument parameters. Particularly, it boasts historic breakthrough in such key technical problems as high temperature resistance, vibration resistance and processing with low consumption. Besides, it combines modern high-tech mechatronics measurement and control technologies, adopts high-precision D/D amplification converter, import microprocessor CPU, D/A converter for processing, features output site LCD, pulse, 4~20mA,RS232/485, GPRS remote monitoring and other powerful functions, thus achieving site working flow rate measurement and remote measurement and control.

It is widely applied to measure volume flow rates and mass flow rates of liquid, gas and steam in closed pipelines.

(2) 工作原理 Operating principle

VSF智能涡街流量计的工作原理是卡门涡街原理（如图1），当流体以一定的速度流过旋涡发生体时，在发生体两侧交替产生两列有规则的旋涡，旋涡在发生体下游呈非对称排列旋涡带，通过传感探头测出旋涡分离频率信号，经其前置放大器放大和微处理器运算处理，实现流体工况的瞬时流量、累积流量的显示和数据远传控制。

Operation principle of VSF intelligent vortex shedding flowmeter is the principle of K á rm á n vortex street (as shown in Fig. 1). When fluid flows past a vortex occurred body at a certain velocity, two rows of regular vortexes will occur alternately along both sides of the occurred body and the vortexes at the downstream of the occurred body present asymmetric arranged vortex belt; vortex separation frequency signal is detected with the sensor probe and then amplified by preamplifier and processed by microprocessor, thus achieving display of instantaneous flow rate and accumulated flow rate and digital remote control of fluid in working state.

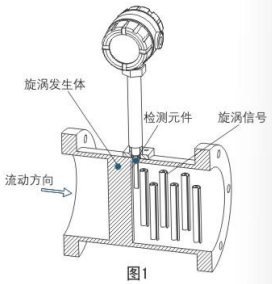


图1

在一定雷诺系数范围内（2×104~7×106）旋涡的分离频率f与流体流速v成正比，与旋涡发生体的宽度d成反比，其数学公式为：

In a certain range of Reynolds number (2×104~7×106), the separation frequency f of vortex is in direct proportion to flow velocity v and is inversely proportional to width of vortex occurred body d, with formula as follows:

$$f=\frac{S_t u_1}{d} \quad \cdots\cdots 1$$

ST即斯特劳哈尔数，是无量纲量。当旋涡发生体的几何形状和尺寸设计得当时，St在很宽的雷诺数Re范围内是一个常数。

St refers to Strouhal number and is a dimensionless quantity. When the geometrical shape and dimensional design of vortex occurred body are appropriately designed, St is a constant within a really wide Reynolds number Re range.

$$Re=\frac{Du}{V} \quad \cdots\cdots 2$$

式中：v——流体的运动粘度；m²/s　Where: v —— kinematic viscosity of fluid; m²/s

D——流量计的通径；mm　D —— diameter of flowmeter; mm

U1——漩涡发生体两侧平均流速　u1 —— mean flow velocity at the both sides of vortex occurred body

U——流体流速；m/s　u —— fluid flow velocity; m/s

由于d和St是常数，而U1与管内平均流速U有固定关系

Since d and St are constants, U1 and mean flow velocity of pipe U have a fixed relation

$$U_1=\frac{U}{1-1.25\frac{d}{D}} \quad \cdots\cdots 3$$

于是 Therefore

$$f=\frac{U}{(1-1.25\frac{d}{D})d} \quad \cdots\cdots 4$$

测得旋涡分离频率f就测得管内平均流速U，从而测得体积流量。一段时间内分离旋涡的个数N与流过流体的体积V之比（单位体积对应的旋涡数）称为仪表系数K：

if vortex separation frequency f is detected, then flow velocity of pipe U is obtained and then volume flow rate is obtained. The ratio of the separation vortex number N and the volume V where fluid flows past (vortex number in a unit volume) in a period is called instrument coefficient K:

$$K=\frac{N}{V} \quad \cdots\cdots 5$$

用于测量流量的旋涡分离频率随流速而变化，不受流体密度和粘度的影响。伴随旋涡分离而产生的局部压力脉动由传感器探头检测出来，并在信号放大处理电路中被转换成与旋涡频率相对应的脉冲信号。经信号处理器输出4~20mA的标准电流信号与工况流量相对应，或RS232/485通讯方式输出。

The vortex separation frequency for flow rate measurement changes along with flow rate and is not influenced by fluid density and viscosity. Local pressure pulsation incurred along with vortex separation is detected by sensor probe and converted to pulse signal corresponding to vortex frequency in the signal amplification circuit. After signal processor, 4~20mA standard current signal is output to correspond to working flow rate, or is output in RS232/485 communication mode.

(3) 性能特征 Performance characteristic

1 结构特点 Structure features

a、采用抗冲击、抗机械振动、抗脏污的全新型结构设计；
b、运用可靠、微功耗元器件和STM表贴技术安装工艺，使用寿命长、性能稳定、可靠性高；
c、完整的口径系列：DN10~DN600；
d、从压电探头，检测电路部件到显示仪表，实现了高度互换性和通用性；
e、可选自带测温探头，测量饱和蒸汽流量无需另装温度传感器；
f、普通型和本质安全型采用铝合金外壳，抗干扰强，更适用于工业场合应用；

A. Adopt a brand-new structure design with impact resistance, mechanical vibration resistance and dirt resistance;
b. Apply reliable micro-consumption components and STM (surface mounting technology), featuring long life service, stable performance and high reliability;
c. Complete caliber series: DN10~DN600;
d. Achieve high interchangeability and universality from piezoelectric probe, detection circuit components and display instrument;
e. Provide optional built-in temperature measuring probe; thus it is not necessary to additionally install temperature sensor to measure saturated steam flow rate;
f. Ordinary type and instinct safety type adopt aluminium alloy housing, with strong anti-interference, more applicable to industry sites;

2 功能特点 Functional features

A、现场液晶显示器，累积量、瞬时流量同时显示，根据工况需要还可同时显示压力和温度（选项功能），构成工况检测一体化；
B、流量下限为普通涡街的1/2~1/4；
C、拓宽的流量量程比12:1~32:1；
D、采用电气隔离，隔离电压1500V；
E、全数字化调试，无任何拨码开关；
F、增益自调整，适应传感器信号衰减；
G、内嵌涡街波形检测和波形显示器；
H、内嵌流量积算仪，9位总量显示；
I、采用轻触薄膜按键，外供电源背光液晶显示；
J、内置3.6VDC锂电池，可连续工作20000小时，电量不足时显示屏上提示电量不足；
K、标准的脉冲当量输出，便于实现现场控制；
L、标准的串口通讯RS232/485（选项功能）；
M、标准的工业4~20mA电流信号或Hart协议（选项功能）；
N、具备阻尼时间和小信号切除功能；
O、微功耗双电源设计，仪表采用E2PROM技术，内部参数永久保存；
P、具备上、下限流量报警功能（选项功能）；
Q、具备零位自动调整，消除零位漂移；
R、操作简便，具有多种输出信号接口，方便联机；
S、具备操作用户口令权限界面，防止非法修改参数，方便管理。

A. With site LCD, accumulated flow rate and instantaneous flow rate display simultaneously and pressure and temperature can also be displayed simultaneously based on working conditions (optional function), thus constituting measurement integration of working conditions;
b. The lower limit of flow rate is 1/2~1/4 of ordinary vortex street;
C. Expanded flow rate span ratio is 12:1~32:1;
d. Electrical isolation is adopted, with isolation voltage of 1500V;
e. Full digitalization commissioning, no any dial switch;
F. Gain self-adjustment, adaptive to attenuation of sensor signal;
g. Built-in vortex street waveform detection and waveform display;
h. Built-in flow totalizer, 9-digital total amount display;
i. Adopt touch membrane keyboards, backlight LCD display with external power source;
j. Built-in 3.6VDC lithium battery, with continuous 20000 h work duration, showing low battery on the display screen in case of low battery;
k. Standard pulse equivalent output, convenient for site control;
l. Standard serial communication RS232/485 (optional function);
m. Standard industrial 4~20 mA current signal or Hart protocol (optional function);
n. Have damping time and small signal removal functions;
o. Micro-consumption dual power supply design, E2PROM technology for instrument, thus having internal parameter permanent preserved;
p. Have lower and upper limit flow rate alarm function (optional function);
q. Automatic zero adjustment to eliminate zero drift;
r. Easy for operation, have multiple output signal interfaces, easy for online operation;
s. Have operator password authority interface to prevent illegal modification of parameters, good for management.

(4) 参数及指标 Parameter and indexes

适应环境温度 Acceptable ambient temperature	－40℃～＋60℃
适用工况流体温度 Applicable working fluid temperature	普通型 Ordinary type －40℃～＋135℃　高温性 High-temperature type －40℃～＋280℃　特高温型 Extra-high-temperature type －40℃～＋350℃
工作湿度范围 Working humidity range	≤95%
测量范围 Measuring range	液体10:1；气体、蒸汽15:1 10:1 for liquid ; 15:1 for gas and stream
准确度 Accuracy	液体 Liquid ±0.5%～±1.0%　气体 Gas ±1.0%～±1.5%　蒸汽 Stream ±2.5%
重复性 Repeatability	≤准确度的三分之一 ≤1/3 of accuracy
工作电压 Working voltage	内置3.6VDC；外供电源24 VDC；配220VAC/24VDC电源转换器。 Built-in 3.6VDC; external power supply 24VDC; equipped with 220VAC/24VDC power converter
最大负载能力 Max. load capacity	300Ω（随电源电压减小而减小） 300Ω (decreases along with the decrease of voltage of power supply)
工作额定压力 Working rated pressure	1.6～26MPa
压力损失 Pressure loss	$\Delta P=1.08\times\rho\times V^2$（ΔP为压力损失Pa；ρ为流体工况密度kg/m³；V为工况流速m/s） (ΔP refers to pressure loss Pa; ρ is fluid working density (kg/m³); Vis working flow velocity (m/s))
壳体材质 Housing material	碳钢；304、316L不锈钢；其他特殊材质订货时确认 Carbon steel; 304, 316L stainless steel; other special materials are confirmed at the time of ordering

(5) 选型编码 Selection coding

选型编码仅为生产流量计的技术依据和基准，具体产品型号以订货时确认为准

Selection coding is only the technical basis and benchmark of flowmeter production and detailed product models are subject to the confirmation at the time of ordering

VSF	智能涡街流量计 Intelligent vortex shedding flowmeter							
代号 Code	公称通径 Nominal diameter							
0010	DN10							
⋮	⋮							
1000	DN1000							
⋮	⋮							
3000	DN3000							
代号 Code	安装方式 Installation mode							
D	对夹型 DN10～DN300 Wafer type DN10~DN300							
F	法兰型 DN25～DN600 Flange type DN25~DN600							
J	插入型≥DN300 Insert type ≥DN300							
代号 Code	公称压力 Nominal pressure							
A	0.6 MPa	G	5.0MPa	M	26MPa			
B	1.0MPa	H	6.0MPa					
C	1.6MPa	I	10MPa					
D	2.0MPa	J	11MPa					
E	2.5MPa	K	15MPa					
F	4.0MPa	L	16MPa					
代号 Code	壳体材质 Housing material							
B	不锈钢 Stainless steel							
T	碳钢 Carbon steel							
G	工程合金塑料 Alloy engineering plastics							
代号 Code	工况液体温度 Working liquid temperature							
P	普通型−40℃～+135℃ Ordinary type -40℃~+135℃							
G	高温型−40℃～+280℃ High-temperature type -40℃~+280℃							
R	特高温型−40℃～+350℃ Extra-high-temperature type -40℃~+350℃							
代号 Code	防爆标示 Explosion-proof mark							
B	本安型 Ⅱ类 Intrinsic safety Exia II							
G	隔爆型 Ⅱ类 Explosion-proof type Exd II							
G	隔爆型 Ⅰ类 Explosion-proof type Exd I							
P	普通型 Ordinary type							
代号 Code	输出方式 Output method							
E	二次仪表 Secondary instrument							
L	4～20mA(二线制) 4~20mA (two-wire system)							
H	4～20mA+HART 协议 4~20mA+HART protocol							
R	MODBUS 通讯协议 MODBUS communication protocol							
M	脉冲发信 Pulse transmitting							
T	通讯输出 RS485 Communication output RS485							
X	现场读值 Site reading							
K	节点开关量 Node switch value							
1	流量点报警输出 Alarm output of flow point							
2	定量报警输出 Quantitative alarm output							

VSF 0100 D B B P B M

VSF0100DBBPBM含意为：智能涡街流量计公称通径为100mm，对夹型安装方式，公称压力为1.0MPa，使用在普通型温度流体场合，采用不锈钢材质壳体，本安型电路，输出为脉冲输出方式发信。

VSF0100DBBPBM means: intelligent vortex shedding flowmeter, nominal diameter 100 mm, wafer type installation manner, nominal pressure 1.0 MPa, used in ordinary type temperature fluid sites, with stainless steel housing, intrinsic safety circuit and pulse output manner for transmitting.

(6) 流量范围选型 Selection of flow rate range

1、标准空气状态下工况流量范围表 Working flow rate range table under standard air condition

口径 MM Caliber MM	标准测量范围 m^3/h Standard measurement range	可选测量范围 m^3/h Optional measurement range	输出频率范围 Hz Output frequency range
20	6–50	6–60	220–3400
25	8–60	8–120	180–2700
32	14–100	14–150	130–1400
40	18–180	18–310	90–1550
50	30–300	30–480	80–1280
65	50–500	50–800	60–900
80	70–700	70–1230	40–700
100	100–1000	100–1920	30–570
125	150–1500	140–3000	23–490
150	200–2000	200–4000	18–360
200	400–4000	320–8000	13–325
250	600–6000	550–11000	11–220
300	1000–10000	800–18000	9–210
350	1500–15000	1100–24000	8–175
400	1800–18000	1500–30800	7–143
450	2100–21000	2000–35000	6–90
500	2500–25000	2000–48000	5–120
600	3200–32000	2500–70000	3.5–98

2、标准水介质状态下工况流量范围表 Working flow rate range table under standard aqueous medium condition

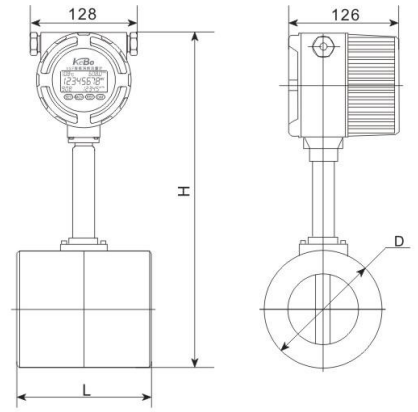
口径 MM Caliber MM	标准测量范围 m^3/h Standard measurement range	可选测量范围 m^3/h Optional measurement range	输出频率范围 Hz Output frequency range
15	1–6	0.8–8	90–900
20	1.2–8	1–15	40–600
25	2–16	1.6–18	35–400
32	2.2–20	1.8–30	20–250
40	2.5–25	2–48	10–240
50	3.5–35	3–70	8–190
65	6–60	5–85	7–150
80	13–130	10–170	6–110
100	20–200	15–270	5–90
125	30–300	25–450	4.5–76
150	50–500	40–630	3.8–60
200	100–1000	80–1200	3.2–48
250	150–1500	120–1800	2.5–37.5
300	200–2000	180–2500	2.2–30.6
350	300–3000	220–3500	1.7–27
400	350–3500	300–4500	1.4–21
450	420–4200	400–6000	1.2–15
500	500–5000	400–7100	1.0–17.8
600	700–7000	500–10000	0.7–14

3、饱和蒸汽的流量范围表
Flow rate range table of saturated steam

公称通径 Nominal diameter	0.2MPa	0.3MPa	0.4MPa	0.5MPa	0.6MPa	0.7MPa	0.8MPa
DN15	6～27kg/h	9～40kg/h	10～50kg/h	13～65kg/h	15～75kg/h	18～90kg/h	20～110kg/h
DN20	10～80kg/h	12～110kg/h	15～150kg/h	16～160kg/h	18～180kg/h	20～220kg/h	21～250kg/h
DN25	14～120kg/h	15～170kg/h	18～205kg/h	22～260kg/h	24～340kg/h	25～360kg/h	27～440kg/h
DN30	15～160kg/h	20～250kg/h	30～360kg/h	35～380kg/h	40～480kg/h	45～520kg/h	50～580kg/h
DN40	30～300kg/h	36～440kg/h	45～520kg/h	48～720kg/h	50～860kg/h	55～900kg/h	60～1100kg/h
DN50	48～490kg/h	60～600kg/h	75～800kg/h	80～1160kg/h	0.1～1.2t/h	0.12～1.5t/h	0.14～1.8t/h
DN65	60～750kg/h	80～970kg/h	0.12～1.4t/h	0.16～1.9t/h	0.18～1.9t/h	0.21～2.4t/h	0.23～2.6t/h
DN80	85～980kg/h	0.14～1.6t/h	0.17～1.9t/h	0.2～2.4t/h	0.24～2.9t/h	0.28～3.2t/h	0.35～4.1t/h
DN100	0.1～1.6t/h	0.18～2.5kg/h	0.24～3.2t/h	0.3～4.0t/h	0.4～5.2t/h	0.5～6.0t/h	0.58～6.4t/h
DN125	0.2～3.0t/h	0.3～4.30t/h	0.35～4.5t/h	0.4～5.10t/h	0.52～6.5t/h	0.6～7.20t/h	0.75～8.8t/h
DN150	0.32～4.4t/h	0.4～5.2t/h	0.5～6.5t/h	0.6～7.5t/h	0.8～9.8t/h	0.9～10.2t/h	1.12～12.5t/h
DN200	0.45～6.5t/h	0.80～10.5t/h	1.05～12.8t/h	1.4～15.6t/h	1.8～20.5t/h	2.0～28t/h	2.2～30t/h
DN250	0.8～11t/h	1.3～15.5t/h	1.6～21t/h	1.8～25t/h	2.0～30t/h	2.4～36t/h	3.2～40t/h
DN300	1.2～18t/h	1.8～22t/h	2.3～30t/h	2.8～36t/h	3.5～42t/h	4.2～53t/h	4.7～58t/h

公称通径 Nominal diameter	0.9MPa	1.0MPa	1.2MPa	1.4MPa	1.6MPa	1.8MPa	2.0MPa
DN15	18～125kg/h	20～140kg/h	22～155kg/h	25～180kg/h	26～200kg/h	28～220kg/h	30～240kg/h
DN20	20～220kg/h	22～350kg/h	24～410kg/h	27～480kg/h	29～530kg/h	30～620kg/h	35～680kg/h
DN25	28～340kg/h	30～410kg/h	34～470kg/h	39～530kg/h	42～620kg/h	45～690kg/h	50～780kg/h
DN32	40～580kg/h	54～650kg/h	59～710kg/h	63～780kg/h	71～830kg/h	80～980kg/h	0.1～1.15t/h
DN40	60～980kg/h	0.07～1.3t/h	0.08～1.6t/h	0.09～1.8t/h	0.11～2.0t/h	0.18～2.3t/h	0.20～2.7t/h
DN50	0.10～1.5t/h	0.12～1.8t/h	0.16～1.9t/h	0.20～2.2t/h	0.23～2.5t/h	0.26～3.0t/h	0.30～3.3t/h
DN65	0.11～1.4t/h	0.16～2.0t/h	0.18～2.2t/h	0.21～2.7t/h	0.25～3.2t/h	0.28～3.4t/h	0.31～3.5t/h
DN80	0.18～2.6t/h	0.29～3.8t/h	0.35～3.8t/h	0.42～5.6t/h	0.50～6.8t/h	0.62～7.0t/h	0.65～7.5t/h
DN100	0.27～3.5t/h	0.32～4.1t/h	0.38～4.5t/h	0.44～4.5t/h	0.52～6.0t/h	0.68～7.7t/h	0.75～8.5t/h
DN125	0.35～5.4t/h	0.62～7.5t/h	0.8～8.6t/h	1.2～14t/h	1.5～18t/h	1.8～22t/h	2.2～25t/h
DN150	0.9～11t/h	1.2～13t/h	1.4～15t/h	1.7～22t/h	1.8～24t/h	2.0～28t/h	2.2～30t/h
DN200	1.30～15t/h	1.6～18t/h	1.8～22t/h	2.3～30t/h	2.8～36t/h	3.5～42t/h	4.2～53t/h
DN250	2.6～32t/h	3.5～38t/h	3.8～41t/h	4.2～44t/h	4.5～48t/h	4.9～53t/h	5.2～65t/h
DN300	3.8～42t/h	4.3～56t/h	4.7～63t/h	5.5～65t/h	6.2～72t/h	7.8～85t/h	8.5～98t/h

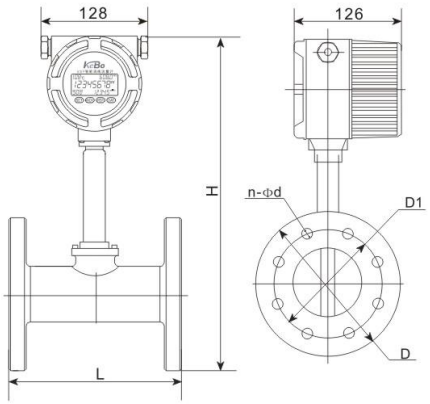
(7) 产品外形及连接尺寸 Product appearance and connection dimension



夹装式
Clamp-on type

夹装式(单位mm) Clamp-on type (unit: mm)

规格 Specification	L	D	H 普通型 Ordinary type	H 高温型 High-temperature type
DN10	66	67	360	370
DN15	66	67	360	370
DN20	66	67	360	370
DN25	66	67	360	370
DN32	66	67	365	370
DN40	80	78	370	380
DN50	80	89	375	395
DN65	93	102	383	400
DN80	100	113	390	420
DN100	125	135	400	460
DN125	145	158	470	520
DN150	165	181	500	540
DN200	196	248	580	620
DN250	160	290	650	700
DN300	190	340	700	750



法兰式
Flange type

法兰式(单位mm) Flange type (unit: mm)

规格 Specification	L	D	D1	n-Φd	H 普通型 Ordinary type	H 高温型 High-temperature type
DN25	200	115	85	4x14	360	450
DN32	200	140	100	4x18	370	460
DN40	200	150	110	4x18	380	470
DN50	200	165	125	4x18	395	485
DN65	250	185	145	4x18	415	505
DN80	250	200	160	8x18	425	515
DN100	250	220	180	8x18	455	545
DN125	300	250	210	8x18	485	575
DN150	300	300	250	8x26	515	605
DN200	350	360	310	12x26	595	685
DN250	400	425	370	12x30	630	720
DN300	500	485	430	12x30	685	775

三 EMF 智能电磁流量计
III EMF intelligent electromagnetic flowmeter

一体式智能电磁流量计		Integrated intelligent electromagnetic flowmeter	
公称口径	10~300mm	Nominal diameter	10~300mm
公称压力	0.6~42Mpa	Nominal pressure	0.6~42Mpa
介质温度	-30~180℃	Medium temperature	-30~180℃
精度等级	0.2；0.5；1.0	Accuracy class	0.2；0.5；1.0
量程范围	1:3;1:5;1:10	Scale range	1:3;1:5;1:10
壳体材质	碳钢；304；316L	Housing material	carbon steel；304；316L
工作电压	24VDC；220V	Working voltage	24VDC；220V
输出信号	4~20mA(两线制);脉冲;RS485;HART	Output signal	4~20mA(two-wire system); pulse;RS485;HART
防护等级	EP65;IP67;IP68	IP grade	EP65;IP67;IP68

公称口径Nominal diameter: 可插入式可到3000mm up to 3000 mm for insert type

分体式智能电磁流量计		Separate type intelligent electromagnetic flowmeter	
公称口径	10~300mm	Nominal diameter	10~300mm
公称压力	0.6~42Mpa	Nominal pressure	0.6~42Mpa
介质温度	30~180 ℃	Medium temperature	30~180 ℃
精度等级	0.2；0.5；1.0	Accuracy class	0.2；0.5；1.0
量程范围	1:3;1:5;1:10	Scale range	1:3;1:5;1:10
壳体材质	碳钢；304；316L	Housing material	carbon steel；304；316L
工作电压	24VDC；220V	Working voltage	24VDC；220V
输出信号	4~20mA(两线制);脉冲;RS485;HART	Output signal	4~20mA(two-wire system); pulse;RS485;HART
防护等级	EP65;IP67;IP68	IP grade	EP65;IP67;IP68

公称口径Nominal diameter: 可插入式可到3000mm up to 3000 mm for insert type

(1) 概述 Overview

EMF智能电磁流量计是采用国内外最先进技术研制开发的全智能型电磁流量计，其中英文界面电磁转换器内核采用高速中央处理器。运算速度快、精度高、测量性能可靠。转换器电路设计采用国际先进技术，输入阻抗高达1015Ω，共模抑制比优于100db,对于外来干扰以及60Hz/50Hz干扰抑制能力优于90db,可以测量更低的电导率的流体介质流量。其传感器采用非均匀磁场技术及特殊的磁路结构，磁场稳定可靠，而且大的缩小了体积，减轻了重量，使流量计小型轻量化的特点。

由于电磁流量计有其独特的优点，因此被广泛应用于化工化纤、食品、造纸、制糖、矿冶、给排水、环保、水利水工、钢铁、石油、制药等工业领域中，用来测量各种酸、碱、盐溶液、泥浆、矿浆、纸浆、煤水浆、玉米浆、纤维浆、粮浆、石灰乳、污水、冷却原水、给排水、盐水、双氧水、啤酒、麦汁、各种饮料、黑液、绿液等导电液体介质的体积流量。

EMF intelligent electromagnetic flowmeter is a full intelligent electromagnetic flowmeter researched and developed with domestic and foreign state-of-the-art technologies, and the core of English interface electromagnetic converter is high-speed central processor. It features quick computing speed, high accuracy and reliable measurement performance. The converter circuit is designed with international advanced technologies, with input impedance up to 1015 Ω, common mode rejection ratio higher than 100 db, and extraneous interference and 60 Hz/50 Hz interference rejection capability better than 90 db, able to measure fluid medium flow rate with lower conductivity. Its sensor is designed with inhomogeneous magnetic field technology and special magnetic structure, featuring stable and reliable magnetic field, and due to the reduction of volume, weight is lighter, making flowmeter have small size and light weight.

Since electromagnetic flowmeter has unique advantages, it is widely applied in such industries as chemical and chemical fiber, food, papermaking, sugar refinery, metallurgy, water supply and drainage, environmental protection, water conservation, steel, petroleum, pharmacy to measure volume flow rates of conductive liquid media, such as various acid, alkali, salt solution, mud, ore pulp, paper pulp, coal water slurry, corn steep liquor, fiber pulp, syrup, lime milk, sewage, cooling raw water, supplied and drained water, salt water, hydrogen peroxide, beer, wort, various drinks, black liquor and green liquor.

(2) 工作原理 Operating principle

电磁流量计测量原理是基于法拉第电磁感应定律。流量计的测量管为内衬绝缘材料的非导磁合金短管。两只电极沿管径方向穿通管壁固定在测量管内。电极探头与衬里内表面齐平。励磁线圈由双向波脉冲励磁时，将在与测量管轴线垂直的方向上产生一磁通量密度为B的工作磁场。此时，如果具有一定电导率的流体流经测量管。将切割磁力线感应出电动势E。电动势E与磁通量密度B成正比，测量管内径d与平均流速v的乘积。电动势E（即流量信号）经电极检出并通过电缆送至放大器进入处理后，可显示流体流量，并能输出脉冲，模拟电流等信号，用于流量的控制和调节。

Flowmeter is based on Faraday's law of induction. Measuring pipe of flowmeter is non-permeable alloy stub pipe lined with insulating materials. Two electrodes punch through pipe wall along pipe diameter direction and are fixed within the measuring pipes. Electrode probe keeps flush with the internal surface of lining. Magnet exciting coils are excited by bidirectional pulse and will generate a magnetic field with

magnetic flux density of B in the direction vertical to measuring pipe axis. Therefore, if there is fluid with a certain conductivity flowing through the measuring pipe, the fluid will cut magnetic lines of force and induce electromotive force E. Electromotive force E is in direct proportion to magnetic flux density B and is the product of internal diameter of measuring pipe d and mean flow velocity v. After electromotive force E (i.e. flow signal) is detected by electrodes and sent to amplifier for processing through wire, it can show fluid flow rate, output pulse and simulate current and other signals for control and adjustment of flow rate.

$$E=KBdv$$

式中：E-----为电极间的信号电压（v）Signal voltage between electrodes (V)
Where
k-----仪表常数 Instrument constant
B-----磁通密度（T） Magnetic flux density (T)
d-----测量管内径（m） internal diameter of measuring pipe (m)
V-----平均流速（m/s） Mean flow velocity (m/s)

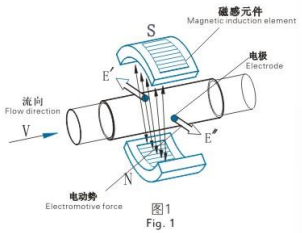


图1
Fig. 1

式中k，d为常数，由于励磁电流是恒流的，故B也是常数，则由E=KBdv可知，体积流量Q与信号电压E成正比，即流速感应的信号电压E与体积Q成线性关系。因此，只要测量出E就可确定流量Q，这是电磁流量计的基本工作原理。

由E=KBdv可知，被测流量体介质的温度、密度、压力、电导率、液固两相流体介质的液固成分比等参数不会影响测量结果。至于流动状态只要符合轴对称流动（如层流或者紊流）就不会影响测量结果的。因此说电磁流量计是一种真正的测量体积流量计。对于制造商和用户来说，只要用普通的水实际标定后就可以测量其他任何导电流体介质的体积流量，而不需要任何修正。这是电磁流量计的一突出优点，是其他任何流量计所没有的。测量管内无活动及阻流部件，因此几乎没有压力损失，并且有极高的可靠性和稳定性。

Where: k and d are constants, and since exciting current is constant current, B is also a constant; therefore, it can be seen from E=KBdv that volume flow Q is in direct proportion to signal voltage E, i.e. the signal voltage E of velocity induction and volume Q are in linear relation. Therefore, Flow Q can be determined if E is measured. This is the fundamental operating principle of electromagnetic flowmeter.

It can be seen from E=KBdv that such parameters of measured fluid media as temperature, density, pressure, conductivity, and fluid-solid composition ratio of fluid-solid two-phase fluid media will not influence the measurement results. And the flow state will also not influence the measurement results if it is axisymmetric flow (e.g. laminar flow or turbulent flow). Therefore, electromagnetic flowmeter is a real flowmeter for volume measurement. Manufacturers and users are allowed to use it to measure the volume flow rate of any other conductive fluid media after actual calibration with ordinary water, and no any amendment is required. This is a highlight and uniqueness of electromagnetic flowmeter. Thanks to no movable and flow-choking components within the measuring pipe, there is almost no pressure loss and the product shows extremely high reliability and stability.

(3) 性能特征及参数指标 Performance characteristic and parameter index

1、公称通径系列DN（mm）
管道式四氟衬里：10，15，20，25，32，40，50，65，80，100，125，150，200，250，300，350，400，450，500，600
管道式橡胶衬里：40，50，65，80，100，125，150，200，300，350，400，500，600，800，1000，1200，1400，1600，1800，2000
注：特殊规格可以定制
2、流动方向
正，反，净流量
量程比：1:50
重复性：测量值的±0.1%
3、精度等级：管道式：0.5级，1.0级
插入式：1.0级，1.5级
4、被测介质温度：
普通橡胶衬里：-20~+60℃
高温橡胶衬里：-20~+90℃
聚四氟乙烯衬里：-30~+100℃
高温型乙烯衬里：-30~+180℃
5、额定工作压力：
管道式：DN10~DN65，≤2.5MPa；Dn80~DN150，≤1.6MPa；DN200-DN2000，≤1.0MPa；
注：特别规格可以定制
6、流量测量范围：流量测量范围对应流速度范围是0.25m/s~12m/s
7、电导率范围：被测流体电导率≥5μs/cm（一体式）以水为成份的介质，其导电率在200-800μs/cm范围内，均可选用电磁流量
8、输出电流及负载电阻：4~20mA全隔离负载电阻＜750Ω；脉冲频率0-5KHz光电隔离OCT外接电源≤35V，导通时集电极最大电流为25mA
9、电极材料：含钼不锈钢、钛（Ti）、钽（Ta）、哈氏合金（HC）、铂（Pt）或其它特殊电极材料
10、防护等级：潜水型：IP68，其他型IP65
11、供电电源：85~265VAC，45-63HZ；18-28VDC
12、直管段长度：管道式：上游≥5D，下游≥2D
13、连接方式：流量计与配管之间均采用法兰连接，法兰连接尺寸符合GB9113-2000或HG20592标准要求
14、防暴标志：EdllCT4
15、环境温度：-30℃~+80℃
16、相对温度：5%~95%
17、消耗总功率：小于20W

1. Nominal diameter series DN (mm)
PTFE lined pipeline type: 10, 15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600
Rubber lined pipeline type: 40, 50, 65, 80, 100, 125, 150, 200, 300, 350, 400, 500, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000
Note: customization for special specifications is allowed
2. Flow direction
Forward, reverse and net flow rate
Span ratio: 1:50
Repeatability: measured value ±0.1%
3. Precision grade: pipeline: 0.5 grade, 1.0 grade
Insert type: 1.0 grade, 1.5 grade
4. Temperature of measured media:
Ordinary rubber lining: -20~+60℃
High temperature resistant rubber lining: -20~+90℃
PTFE lining: -30~+100℃
High temperature resistant vinyl lining: -30~+180℃
5. Rated working pressure:
Pipeline type: DN10~DN65, ≤2.5 MPa; DN80~DN150, ≤1.6 MPa; DN200-DN2000, ≤1.0 MPa;
Note: customization for special specifications is allowed
6. Measurement scope of flow rate: the flow velocity range corresponding to flow rate measurement range is 0.25 m/s~12 m/s
7. Conductivity range: for measured fluids having the conductivity not less than 5 μs/cm (integrated type), with media having water as composition, their conductivity is within 200-800 μs/cm, and it is allowed to select electromagnetic flow rate
8. Output current and load resistance: 4~20 mA full-separated load resistance ＜750 Ω; pulse frequency 0-5 KHz, external power supply of opticalcoupler OCT ≤35 V, maximum current of collector when conducting is 25 mA
9. Electrode material: molybdenum stainless steel, titanium (Ti), tantalum (Ta), hastelloy (HC), platinum (Pt) or other special electrode materials
10. Protection grade: submerged type: IP68, other types: Ip65
11. Power supply: 85~265VAC, 45-63HZ; 18-28VDC
12. Straight pipe length: pipeline type: upstream ≥5D, downstream ≥2D
13. Connection type: flange connection is used between flowmeter and pipe fittings, with flange connection size subject to GB9113-2000 or HG20592 standard
14. Explosion-proof mark: EdllCT4
15. Ambient temperature: -30℃~+80℃
16. Relative temperature: 5%~95%
17. Total power consumption: 20W

(4) 选型编码说明 Description of selection coding

产品型号以订货确认选型为准
Product model is subject to the confirmation at the time of ordering

代号Code	智能电磁流量计 Intelligent electromagnetic flowmeter

代号	公称通径 Nominal diameter
0010	DN10
⋮	⋮
1000	DN1000
⋮	⋮
2000	DN2000

代号Code	安装方式 Installation mode
F	法兰型 Flange type
J	插入型 Insert type

代号Code	公称压力 Nominal pressure				
A	0.6 MPa	G	5.0 MPa	M	20 MPa
B	1.0 MPa	H	6.3 MPa	N	25 MPa
C	1.6 MPa	I	10 MPa	O	26 MPa
D	2.0 MPa	J	11 MPa	P	42 MPa
E	2.5 MPa	K	15 MPa		
F	4.0 MPa	L	16 MPa		

代号Code	法兰材质 Flange material
B	不锈钢 Stainless steel
T	碳钢 Carbon steel

代号Code	衬里材料 Lining material
X	橡胶 Rubber
F	四氟 PTFE
P	PAT
T	陶瓷 Ceramic

代号Code	电极材质 Electrode material
B	含钼不锈钢 Molybdenum stainless steel
H	哈氏合金 Hastelloy
T	钛 Titanium
D	钽 Tantalum
P	铂 Platinum
S	特殊 Special

代号Code	供电方式 Power supply mode
D	24VDC
A	220VAC

Output method 代号Code	输出方式
Secondary instrument E	二次仪表
4~20 mA L	4~20mA
4~20 mA+HART protocol H	4~20mA+HART协议
MODBUS communication protocol R	MODBUS通讯协议
Pulse transmitting M	脉冲发信
Communication output RS485 T	通讯输出 RS485
Site reading X	现场读值
Node switch value K	节点开关量

Explosion-proof mark 代号Code	防爆标示
Explosion proof G	隔爆型
Ordinary type P	普通型

EMF 0100 F B B X B D L P

EMF0100FBBXBDLP含意为：智能电磁流量计公称通径为100mm，法兰型安装方式，公称压力为1.0MPa,使用在普通型温度流体场合，采用不锈钢法兰材质，衬里橡胶，输出为4-20mA电流方式发信

EMF0100FBBXBDLP means: intelligent electromagnetic flowmeter, nominal diameter 100 mm, flange type installation manner, nominal pressure 1.0 MPa, used in ordinary type temperature fluid sites, with stainless steel flange material, rubber lining, 4-20 mA circuit manner for transmitting.

(5) 流量选择参考表
Reference table of flow rate selection

口径 Caliber	最大流量选择（m3/h） Max. flow rate selection (m3/h)
10	0.16、0.2、0.25、0.3、0.4、0.5、0.6、0.8、1.0、1.2、1.6、2.0、2.5
15	0.4、0.5、0.6、0.8、1.0、1.2、1.6、2.0、2.5、3.0、4.0、5.0、6.0
20	0.6、0.8、1.0、1.2、1.6、2.0、2.5、3.0、4.0、5.0、6.0、8.0、10.0、12.0
25	1.0、1.2、1.6、2.0、2.5、3.0、4.0、5.0、6.0、8.0、10.0、12.0、16
32	1.6、2.0、2.5、3.0、4.0、5.0、6.0、8.0、10.0、12.0、16、20、25
40	2.5、3.0、4.0、5.0、6.0、8.0、10.0、12.0、16、20、25、30、40
50	4.0、5.0、6.0、8.0、10.0、12.0、16、20、25、30、40、50、60
65	6.0、8.0、10.0、12.0、16、20、25、30、40、50、60、80、100、120
80	10.0、12.0、16、20、25、30、40、50、60、80、100、120、160
100	16、20、25、30、40、50、60、80、100、120、160、200、250
125	25、30、40、50、60、80、100、120、160、200、250、300、400
150	40、50、60、80、100、120、160、200、250、300、400、500、600
200	60、80、100、120、160、200、250、300、400、500、600、800、1000
250	100、120、160、200、250、300、400、500、600、800、1000、1200、1600
300	160、200、250、300、400、500、600、800、1000、1200、1600、2000、2500
350	200、250、300、400、500、600、800、1000、1200、1600、2000、2500、3000
400	250、300、400、500、600、800、1000、1200、1600、2000、2500、3000、4000
450	300、400、500、600、800、1000、1200、1600、2000、2500、3000、4000、5000
500	400、500、600、800、1000、1200、1600、2000、2500、3000、4000、5000、6000
600	600、800、1000、1200、1600、2000、2500、3000、4000、5000、6000、800、10000
700	800、1000、1200、1600、2000、2500、3000、4000、5000、6000、800、10000、12000
800	1000、1200、1600、2000、2500、3000、4000、5000、6000、800、10000、12000、16000
900	1200、1600、2000、2500、3000、4000、5000、6000、800、10000、12000、16000、20000
1000	1600、2000、2500、3000、4000、5000、6000、800、10000、12000、16000、20000、25000
1200	2500、3000、4000、5000、6000、800、10000、12000、16000、20000、25000、30000
1400	3000、4000、5000、6000、800、10000、12000、16000、20000、25000、30000、40000、50000
1600	4000、5000、6000、800、10000、12000、16000、20000、25000、30000、40000、50000、60000
1800	5000、6000、800、10000、12000、16000、20000、25000、30000、40000、50000、60000
2000	6000、800、10000、12000、16000、20000、25000、30000、40000、50000、60000、80000、100000

(6) 电极材料的选择 Selection of electrode material

应根据被测介质的腐蚀性，由用户负责选定。对一般介质，可查有关防腐蚀手册，选定电极材料。对混酸等成份复杂的介质，应做挂片试验。

It is selected by users according to the corrosivity of measured media. For general media, relevant guides about corrosion resistance may be referred to for selection of electrode materials. For media with complicated compositions, such as mixed acid, coupon corrosion test is required.

电极材料的耐腐蚀性（仅供参考）

电极材料	耐腐蚀性能
耐酸钢（ICr18Ni9Ti） 含钼不锈钢 0Cr18Ni12Mo2Ti	对于硝酸、室温下<5%硫酸、沸腾的磷酸、蚁酸、碱溶液，在一定压力下的亚硫酸、海水、醋酸等介质，有较强的耐腐蚀性，可广泛用于石油化工、尿素、维尼纶等工业。 海水、盐水、弱酸、弱碱。
哈氏合金 B（HB）	对沸点以下一切浓度的盐酸有良好的耐腐蚀性，也耐硫酸、磷酸、氢氟酸、有机酸等非氧化性酸、碱、非氧化盐液的腐蚀。
哈氏合金 C（HC）	能耐氧化性碱。如硝酸、酸或铬酸与硫酸的混合介质的腐蚀，也耐氧化性的盐酸类，如Fe+++、Cu++或含其它氧化剂的腐蚀。如高于常温的次氯酸盐溶液、油水的腐蚀。
钛（Ti）	能耐盐水、各种氯化特和次氯化盐、氧化性酸（包括发烟硫酸、硝酸）、有机酸、碱等的腐蚀。不耐较纯的还原性酸（如硫酸、盐酸）的腐蚀，但如果酸中含有氧化剂时，则腐蚀大为降低。
钽（Ta）	具有优良的耐腐蚀性，和玻璃很相似。除了氢氟酸、发烟硫酸、碱外，几乎能耐一切化学介质腐蚀。
铂（Pt）	适用几乎所有酸碱液耐腐蚀，王水、铵盐等少数介质不适合。

Corrosion resistance of electrode materials (for reference only)

Electrode material	Corrosion resistance
Acid resistant steel (ICr18Ni9Ti) Molybdenum stainless steel 0Cr18Ni12Mo2Ti	For such media as nitric acid, < 5% sulfuric acid in room temperature, boiling phosphoric acid, formic acid, aqueous alkali and sulfurous acid, sea water and acetic acid, with relatively strong corrosion resistance, widely applied in petrochemical industry, urea, vinylon and other industries.
Hastelloy B (HB)	Have favorable corrosion resistance to hydrochloric acid with any concentration under boiling point, and also be corrosion resistant to sulfuric acid, phosphoric acid, hydrofluoric acid, organic acid and other non-oxidizing acids, bases and non-oxidizing saline solution.
Hastelloy C (HC)	Corrosion resistant to oxidizing bases, like mixed media of nitric acid, acid or chromic acid with sulfuric acid, and also corrosion resistant to oxidizing hydrochloric acids, like those including Fe+++, Cu++ or other oxidizing agents. E.g. corrosion of hypo argon acid saline solutions and oil-water at temperature higher than room temperature
Titanium (Ti)	Corrosion resistant to saline water, various chloride and hypo chlorate, oxidizing acids (including oleum, nitric acid), organic acids, bases, etc. No corrosion resistance to relatively pure educing acids (e.g. sulfuric acid and hydrochloric acid), but the corrosion degree will largely reduced if acids contain hydrogenated agent.
Tantalum (Ta)	Have excellent corrosion resistance, similar to glass. Almost corrosion resistant to all chemical media, except hydrofluoric acid, oleum and bases.
Platinum (Pt)	Corrosion resistant to almost all acid and alkali liquors, except for a few media, such as aqua regia and ammonium salt.

(7) 衬里材料的选择 Selection of lining material

应根据被测介质的腐蚀性、磨损性及温度来选择。氯丁橡胶，可耐一般的弱酸，耐温80℃，氯丁橡胶有耐磨性，聚四氟乙烯几乎能耐除磷酸以外的强酸、碱腐蚀，介质温度可达180℃但不耐磨损。聚氨酯橡胶有较好的耐磨损性，但不耐酸、碱腐蚀。耐温度性也差，介质温度小于65℃。

The selection should be based on corrosivity, abrasiveness and temperature of media to be measured. Neoprene can be resistant to general weak acids and 80℃ temperature and has abrasion resistance; polytetrafluoroethylene (PTFE) can be resistant to almost all strong acids and bases except for phosphoric acid and to media temperature up to 180℃, but it is not resistant to abrasion. Polyurethane rubber (PO) has preferable abrasion resistance, but it is not resistant to acids and bases. It also has bad high-temperature resistance and only temperature below 65℃ is acceptable.

常用衬里材料的性能及其适用范围（仅供参考）

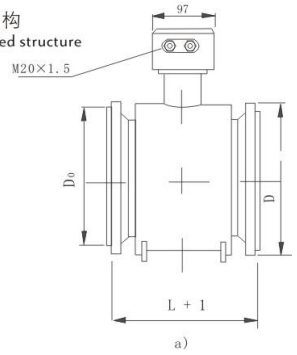
衬里材料	耐腐蚀性能	适用范围
聚四氟乙烯 PTFE	1、它是塑料中化学性能最稳定的一种材料，能耐沸腾的盐酸、硫酸、硝酸、和王水，也能耐浓碱和各种有机溶剂 2、耐磨性和粘接性能差	1、－40℃～+180℃ 2、酸、碱等强腐蚀性介质 3、卫生类介质
氯丁橡胶 (Neoprene)	1、有极好的弹性，高强的扯断力，耐磨性能好 2、耐一般低浓度酸、碱、盐介质的腐蚀，不耐氧化性介质的腐蚀	1、<80℃ 2、测量一般、污水、泥浆、矿浆
聚氨酯橡胶 (Polyurethane)	1、具有极好的耐磨性能（相当于天然橡胶的十倍） 2、耐酸、碱性能较差	1、<65℃ 2、中性强磨损的矿浆、煤浆、泥浆

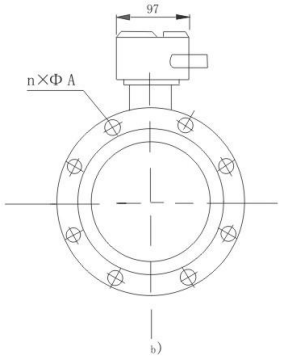
Properties of common lining materials and their scope of application (for reference only)

Lining material	Corrosion resistance	Application scope
Polyfluortetraethylene (PTFE)	1. It is a plastic material with the most stable chemical properties, able to resistant boiling hydrochloric acid, sulfuric acid, nitric acid and aqua regia, as well as strong bases and various organic solvents 2. Bad abrasion resistance and adhesive property	1. −40℃~+180℃ 2. Strong corrosive media, such acids and bases 3. Health type media
Neoprene	1. Excellent elasticity, strong breaking tenacity and good abrasion resistance 2. Corrosion resistant to general media with low concentration such as acids, bases and salts, but not corrosion resistant to oxidizing media	1. < 80℃ 2. Measure general sewage, mud, ore pulp
Polyurethane	1. Excellent abrasion resistance (equivalent to ten times of natural rubber) 2. Relatively bad corrosion resistance to acids and bases	1. < 65℃ 2. Medium and strong abrasion resistance to ore pulp, coal slurry and mud

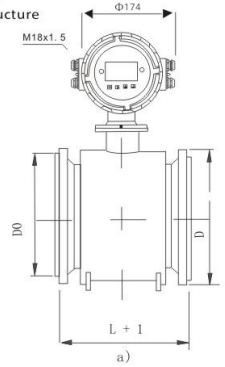
(8) 产品外形及连接尺寸
Product appearance and connection dimension

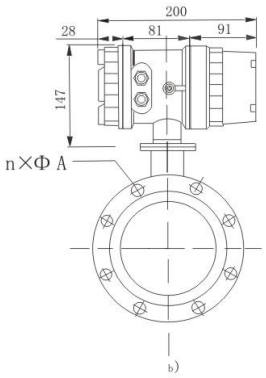
1、分体结构
Separated structure





2、一体化结构
Integrated structure





四 KBEMWF智能电磁水表
IV. KBEMWF intelligent electromagnetic water meter

KBEMWF 智能电磁水表		KBEMWF intelligent electromagnetic water meter	
适用介质	水	Applicable medium	Water
公称通径	DN50~300mm	Nominal diameter	DN50~300mm
Q3/Q1	160	Q3/Q1	160
Q2/Q1	1.6	Q2/Q1	1.6
温度等级	T50	Temperature-resistant grade	T50
准确度等级	2级	Accuracy class	Class 2
工作电压	内置锂电池，外供24VDC	Working voltage	Build-in lithium battery, external power supply 24VDC
输出信号	脉冲, GPRS, CDMA	Output signal	Pulse, GPRS, CDMA
防护等级	IP68	IP grade	IP68
执行标准	GB/T778.1~2007/IS04046~1: 2005	Execution standard	GB/T778.1~2007/IS04046~1: 2005

备注：Q3为最大流量，Q2为临界流量，Q1：最小流量
Remark: Q3 is the maximum flow rate, Q2 is the critical flow rate, Q1 is the minimum flow

(1) 概述 Overview

KBEMWF电磁水表是专为水工业设计，满足城市供水确保准确的水费计算，广泛应用于现场无电源供应场所，如城市供水、污水处理、水利工程、水政水资源等行业。电磁水表特殊设计的传感器励磁系统和高性能锂电池供电系统，并采用了16位嵌入超微功耗处理器，具有全数字量信号处理、测量稳定、测量精度高、抗干扰能力强等特点，实现自动双向流量测量，现场瞬时流量、正反向累计总量显示，自诊断故障报警和GSM数据无线远传等功能，用户通过强大的GSM/GPRS远程管理软件系统可实现流量计数据无线远传，存储等功能。

KBEMWF electromagnetic water meter is specially designed for water industry, meets urban water supply and ensures correct water rates calculation; it is widely applied in site without site power supply, e.g. urban water supply, sewage treatment, water conservancy project, water administration and water resource, etc. Electromagnetic water meter is specially design with sensor excitation system and high-property lithium battery power supply system and applies 16-bit built-in processor with supermicro consumption, featuring all digital quantity signal process, stable measurement, high measurement precision and strong anti-interference and other characteristics, achieving automatic two-way flow measurement, display of site instantaneous flow rate and forward and reverse accumulative total quantity, self-diagnosis of fault for alarm and GSM data wireless transmitting functions; besides, users can enjoy such functions as data wireless transmitting and saving of flowmeter through powerful GSM/GPRS remote management software system.

(2) 工作原理 Operating principle

智能电磁水表测量原理是基于法拉第电磁感应定律。流量计的测量管是一内衬绝缘材料的非导磁合金短管。两只电极沿管径方向穿通管壁固定在测量管上。其电极头与衬里内表面基本齐平。励磁线圈由双方波脉冲励磁时，将在与测量管轴线垂直的方向上产生一磁通量密度为B的工作磁场。此时，如果具有一定电导率的流体水流经测量管。将切割磁力线感应出电动势E。电动势E（流量信号）由电极检出并通过电缆送至表头。转化器将流量信号放大处理后，可显示流体流量，并能输出脉冲，模拟电流等信号，用于流量的控制和调节。

The measurement principle of intelligent electromagnetic water meter is based on Faraday's law of induction. Measuring pipe of flowmeter is a non-permeable alloy stub pipe lined with insulating materials. Two electrodes punch through pipe wall along pipe diameter direction and are fixed on the measuring pipe. Electrode tips almost keep flush with the internal surface of lining. Magnet exciting coils are excited by bidirectional

Pulse and will generate a magnetic field with magnetic flux density of B in the direction vertical to measuring pipe axis. Therefore, if there is fluid with a certain conductivity flowing through the measuring pipe, the fluid will cut magnetic lines of force and induce electromotive force E. Electromotive force E (flow rate signal) is detected by electrodes and sent to the meter through wire. After amplification processing of flow rate signal, the converter can show fluid flow rate, output pulse and simulate current and other signals for control and adjustment of flow rate.

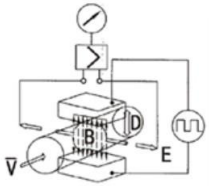
$$E=KBdv$$

式中：E--------为电极间的信号电压（v） Signal voltage between electrodes (V)

B------ 磁通密度（T） Magnetic flux density (T)

d--------测量管内径（m） nternal diameter of measuring pipe (m)

v--------坪均流速（m/s） Mean flow velocity (m/s)



工作原理图

式中k，d为常数，由于励磁电流是恒流的，故B也是常数，则由E=KBdv可知，体积流量Q与信号电压E一成正比，即流速感应的信号电压E与体积Q成线性关系。因此，只要测量出E就可确定流量Q，这是智能电磁水表的基本工作原理。由E=KBdv可知，被测流量体介质水的温度、密度、压力、电导率等参数不会影响测量结果。至于流动状态只要符合轴对称流动（如层流或者紊流）就不会影响测量结果的。测量管内无活动及阻流部件，因此几乎没有压力损失，并且有极高的可靠性。

Where: k and d are constants, and since exciting current is constant current, B is also a constant; therefore, it can be seen from E=KBdv that volume flow Q is in direct proportion to signal voltage E, i.e. the signal voltage E of velocity induction and volume Q are in linear relation. Therefore, Flow Q can be determined if E is measured. This is the fundamental operating principle of intelligent electromagnetic water meter. It can be seen from E=KBdv that such parameters of measured fluid media as temperature, density, pressure and conductivity. And the flow state will also not influence the measurement results if it is axisymmetric flow (e.g. laminar flow or turbulent flow). Thanks to no movable and flow-choking components within the measuring pipe, there is almost no pressure loss and the product shows extremely high reliability.

(3) 性能特征 Operating Principle Diagram

▲转换器标配一个常规锂电池组，可持续工作3--6年。若配用高容量锂电池组，持续工作时间会更长。

▲具有GPRS和CDMA无线数据传输功能；具有RS485modbus协议（外供电或电池供电两种方式）通讯功能，此外还具有SRD基站式无 线网络通讯系统，实现数据采集和管理。

▲采用ABS塑料电镀表壳，IP68密封防护设计，可使用在井下等潮湿场合。

▲管道内无可动部件，无阻流部件，测量中几乎没有附加压力损失。

▲测量结果与流速分布，流体压力，温度、密度等物理参数无关。

▲全中文菜单操作，使用方便，操作简单，易学易懂。

▲采用SMD器件和表面贴装（SMT电路）可靠性高。

▲采用16位嵌入式微处理器，运算速度快，精度高，可编程频率低频矩形波励磁，提高了流测量的稳定性，功耗

▲全数字量的处理，抗干扰能力强，测量可靠，精度高，流量测量范围可达160:1;

▲超低EMI开关电源，使用电源电压变化范围大，抗EMC好；

▲内部具有三个积算器可分别显示正向累计量及差值积算量，内部设有不掉电时钟，可记录16次掉电时间

▲ Converter is normatively equipped with a conventional lithium battery pack for continuous work period of 3-6 years. If it is equipped with high-capacity lithium battery pack, the continuous working period will be longer.

▲ Have GPRS and CDMA wireless data transmission function, RS485modbus protocol (external power supply or battery) communication function, as well as SRD base type wireless network communication system, thus achieving data collection and management.

▲ Adopt ABS plastic plating watch case, IP68 seal protection design, applicable in wet sites, such as downhole.

▲ Thanks to no movable and flow-choking components within the measuring pipe, there is almost no pressure loss in measurement.

▲ Measurement results are not related to velocity distribution, fluid pressure, and such physical parameters as temperature and density.

▲ Menu in Chinese is easy for operation and use, user-friendly.

▲ Adopt SMD (Surface Mount Device) and surface mounting technology (SMT circuit), high reliability.

▲ Adopt 16-bit built-in microprocessor featuring quick arithmetic speed and high precision, and programmable low-frequency rectangular wave excitation, improving stability of flow measurement, low-consumption.

▲ All digital quantity treatment, strong anti-interference, reliable measurement, high precision, flow measurement range up to 160:1;

▲ Ultralow EMI switch power supply, large voltage variation range of the power supply, good EMC;

▲ Internally equipped with three totalizers which respectively show positive accumulated quantity and totalized difference quantity, and with non-power-down clock which can record 16 times of power-down time

(4) 参数及指标 Parameter and indexes

1、智能电磁水表工作电压可以采用3.6VDC和外供24VDC的双供电源方式，可以满足用户不同需求。

2、适应工作环境温度0~+80℃

3、适应工作流体温度0~80℃

4、最大允许误差：

4.1、低区的最大允许误差

水温在额定工作条件规定范围以内时，以最小流量（Q1）与分界流量（Q2）（不包括Q2）之间的流量排出的体积的最大允许误差为±5%

4.2\高区的最大允许误差

以分界流量（Q2）（包括Q2）与过载流量之间的流量排出的体积的最大允许误差：

----------水温≤30℃时为±2%

----------水温＞30℃时为±3%

使用水表中的最大允许误差应为低区和高区给出的最大允许误差的两倍。

5、执行标准：GBA778.1---2007/IS04046-1:2005《封闭满管道中水流量的测量》

1. Operating voltage of intelligent electromagnetic water meter can be the double power supply of 3.6VDC and 24VDC (external power supply), meeting various demands of users.

2. Acceptable operating ambient temperature: 0~+80℃

3. Acceptable operating fluid temperature: 0~80℃

4. Max. allowable deviation:

4.1 Max. allowable deviation at the low area

When water temperature is within the specified scope of rated working conditions, the max. allowable deviation of volume discharged at a flow rate between the min. flow rate (Q1) and transitional flow rate (Q2) (exclusive of Q2) is ±5%

4.2 Max. allowable deviation at the high area

The max. allowable deviation of volume discharged at a flow rate between the transitional flow rate (Q2) (including Q2) and overload flow rate:

----------±2% when water temperature ≤30℃

----------±3 % when water temperature ＞30℃

The max. allowable deviation in the used water meter should be twice the max. allowable deviation given by the low area and the high area.

5. Executive standard: GBA778.1---2007/IS04046-1:2005 Measurement of Water Flow Rate in Enclosed Full Pipeline

（五）选型编码说明

恒劲科博始终致力于产品功能的改进，基于此原因，产品技术规格也会受到更改，如遇上述原因恕不另行通知
Hengjin Kebo has always been committed to improvement of its product features. Therefore, product technical specifications are subject to change without further notice

KBEMWF	智能电磁水表 Intelligent electromagnetic water meter					
	代号 Code	公称通径 Nominal diameter				
	0050	DN50				
	⋮	⋮				
	0300	DN300				
		代号 Code	安装方式 Installation mode			
		F	法兰型 Flange type			
		D	夹装型 Clamp-on type			
			代号 Code	公称压力 Nominal pressure		
			A	0.6MPa	D	2.0MPa
			B	1.0MPa	E	2.5MPa
			C	1.6MPa	F	4.0MPa
				代号 Code	法兰材质 Flange material	
				T	碳钢 Carbon steel	
				B	不锈钢 Stainless steel	
					代号 Code	衬里材料 Lining material
					X	橡胶 Rubber
					F	四氟 PTFE
					P	PAT
						代号 Code	电极材料 Electrode material
						B	含钼不锈钢 Molybdenum stainless steel
						H	哈氏合金 Hastelloy
						T	钛合金 Titanium alloy
					Power supply mode	代号 Code	供电方式 Power supply mode
					Build-in 3.6VDC lithium battery	E	3.6VDC 内置锂电池
						D	24VDC
						Output method	代号 Code	输出方式
						Site display	X	现场显示
						Communication output Rs485	T	通讯输出 RS485

KBEMWF0100FBBXBEX含义：智能电磁水表，公称通径为100mm，法兰型安装方式，公称压力为1.0MPa，法兰材质不锈钢，衬橡胶，B含钼不锈钢电极，现场显示，内置3.6VDC锂电池供电。

KBEMWF0100FBBXBEX means: intelligent electromagnetic flowmeter, nominal diameter 100mm, flange type installation manner, nominal pressure 1.0 MPa, stainless steel flange material, rubber lining, B molybdenum stainless steel electrode, site display, built-in 3.6VDC lithium battery for power supply.

五 FPC流量积算仪

V FPC flow totalizer

（1）产品概述

本仪表是采用美国TI公司的MCU技术并结合现代微电子工艺研制开发的一种通用型、智能化二次仪表。它采用段式数字显示，直观大方。该仪表集自动补偿、介质流量运算、显示及RS485/RS232通讯于_体。具有工作精度高、性能稳定、工作可靠、结构简单、抗干扰能力强、操作方便等优点。它既可配套电流式流量传感器（如：电磁流量传感器等），又能配套频率式流量传感器（如靶式、旋涡、涡轮、椭圆齿轮、旋转活塞等流量传感器），还能进行压力、温度自动补偿（需配Pt100或温度、压力变送器）。可应用于各类液体、气体和蒸气的体积、质量流量及温度和压力等热工参数的测量和控制系统。

（2）产品功能：

a、允许多种信号输入 b、具有自动补偿功能 c、小信号切除

D、显示功能强（累积流量、瞬时流量、压力、温度、频率、电流等数据）

e、上限和定量报警，并输出控制信号 f、多种信号输出 g、断电保护

h、小数点位数设定 i、带累积量清零功能

（3）技术参数

1.输入信号：

(1).模拟量4~20mA或1~5V信号；（2）脉冲量

（3）.温度信号⊙热电偶--K分度号（0~1200℃）⊙热电阻--Pt100（-20~350℃）

2.输出信号：

（1）.输出电流：0~10mA或4~20mA，负载：250Ω~750Ω

（2）.继电器开关输出1组：容量（AC220V，3A）；一路常开，一路常闭

3.电源：220VAC外供电；24VDC外供电

4.使用环境：温度-20~45℃，相对湿度＜90%RH，无凝结

5.精度

（1）. Pt100：±0.2%。K分度号热电偶：±0.3%

K分度号热电偶带冷端温度补偿和不带冷端温度补偿可选

（2）.模拟电流输入量:±0.1%，模拟电压输入量:±0.25%

(3).脉冲输入量:±0.1%

(4).系统误差：0.2%±1个字

(1) Product overview

The instrument is a universal intelligent secondary meter researched and developed by applying MCU technology of American TI (Texas Instruments) and combining modern microelectronics technology. It uses sectional digital display, distinct and simple. The instrument integrates automatic compensation, flow rate calculation of media, display and RS485/RS232 communication. It features high working accuracy, stable performance, reliable work, simple structure, strong anti-interference and convenient operation. It can be supported by current type flow rate sensor (e.g. current flow rate sensor), and by frequency-type current sensor (e.g. target type, vortex, turbine, elliptic gear, rotary piston flow rate sensor) and it can also perform pressure and temperature automatic compensation (Pt100 or temperature, pressure transmitter is required). It can be used for measurement of such thermal parameters as volume, quality flow rate and temperature and pressure of various liquid, gases and steam, as well as for control system.

(2) Functions:

a. Allow for multiple signal input b.Automatic compensation function c. Small signal removal

d. Powerful display function (accumulated flow rate, instantaneous flow rate, pressure, temperature, frequency, current and other data)

e. Ceiling and quantitative alarm and output of control signal f. Multiple signal output g. Power-off protection

h. Setting of decimal places i. Reset of accumulated quantity

(3) Technical parameters

1. Input signal:

(1) Analog quantity 4~20 mA or 1~5V signal; (2) Pulse quantity

(3) Temperature signal ⊙thermocouple --K graduated No. (0~1200℃) ⊙Thermal resistance -- Pt100 (-20~350℃)

2. Output signals:

(1) Output current: 0~10 mA or 4~20 mA, load: 250Ω~750Ω

(2) Relay switch output Group 1: capacity (AC220V, 3A); one circuit is normally open and another is normally closed

3. Power supply: 220VAC external power supply; 24VDC external power supply

4. Service environment: temperature -20~45℃, relative humidity ＜90%RH (without condensation)

5. Accuracy

(1). Pt100: ±0.2%. Graduated No. K thermocouple: ±0.3%

Graduated No. K thermocouple with cold junction compensation and without cold junction compensation, optional

(2) Analog input current: ±0.1%, analog input voltage: ±0.25%

(3) Input pulse: ±0.1%

(4).System error: 0.2%±1 character

企业业绩 ENTERPRISES PERFORMANCE

产品部分典型应用工程

上海宝钢集团	循环水、压缩空气、焦炉煤气计量
厦门洪塘水处理厂有限公司	原水、静水计量
湖南岳磁高新技术有限公司	静水、压缩气体计量
湖南科美达科技股份有限公司	脱氧水、静水计量
内蒙古庆华集团庆华煤化有限责任公司	蒸汽、循环水、甲醇、空气、煤气等计量
宁夏庆华煤化有限公司	脱氧水、脱盐水、冷凝液、蒸汽计量
山东墨龙特种钢铁有限公司	循环水、脱氧水计量
昆山市华林燃料油有限公司	煤气、沥青、重油计量
泰安岳首工程机械集团有限公司	生产循环水、空气及成套设备配套计量
云昆钢铁集团	蒸汽、循环水、煤气、半水煤气计量
湘潭钢铁集团有限公司	氮气、煤气、循环水、蒸气体半水煤气计量
中铁十八局集团有限公司	循环水、高压水、蒸汽计量
芜湖钢铁厂	循环水、脱氧水计量
广西桂林大华药业有限公司	丙酮、药剂、乙醇计量
四川鑫星铝业有限责任公司	循环水、脱氧水计量
福建华映显示科技有限公司	重油、蒸汽、循环水计量
南安祥盛阀门厂	循环水、高压水计量
山东寿光巨能特钢有限公司	循环水、脱氧水计量
南安市华泰消防器材有限公司	循环水、高压水计量
安徽极度酒业有限公司	酒精、水、纯酒计量
上海汽轮发电机股份有限公司	脱氧水、氧气、机油计量
云南海燕防水材料有限公司	沥青、油漆、涂料计量
中核建中核燃料元件公司	天然气、氮气、氢气计量
新疆吐鲁番地区瑞德化轻总厂	蒸汽、循环水、煤气计量
新疆沈宏集团股份有限公司	循环水、煤气计量
厦门特水集团	污水、还原水计量
上海电机厂有限公司	汽轮发电机配套脱氧水、32#机油计量
上海群强橡塑有限公司	循环水、脱氧水计量

企业业绩 ENTERPRISES PERFORMANCE

Some typical applications of products

Baoshan Iron & Steel Co., Ltd.
Measurement of circulating water, compressed air and coke oven gas

Xiamen Hongtang Water Treatment Plant Co., Ltd.
Measurement of raw water and still water

Hunan Yueci Hi-Tech Co., Ltd.
Measurement of raw water and compressed air

Hunan Kemeida Electric Co., Ltd.
Measurement of deoxygenated water and still water

Inner Mongolia Qinghua Group Qinghua Coal Chemical Co., Ltd.
Measurement of steam, circulating water, methyl alcohol, air and coal gas

Ningxia Qinghua Coal Chemical Co., Ltd.
Measurement of deoxygenated water, demineralized water, condensate and steam

Shandong Molong Special Steel Co., Ltd.
Measurement of circulating water and deoxygenated water

Kunshan Hualin Fuel Oil Co., Ltd.
Measurement of coal gas, asphalt and heavy oil

Tai'an Yueshou Engineering Machinery (Group) Co., Ltd.
Measurement of circulating water for production, air and complete equipment

Kunming Iron & Steel (Group) Co. Ltd.
Measurement of steam, circulating water, coal gas and semi-water gas

Hunan Valin Xiangtan Iron and Steel Co., Ltd.
Measurement of nitrogen, coal gas, circulating water, steam and semi-water gas

China Railway 18th Bureau Group Co., Ltd.
Measurement of circulating water, high pressure water and steam

Wuhu Steel and Iron Works
Measurement of circulating water and deoxygenated water

Guilin Dahua Pharmaceutical Co. Ltd.
Measurement of acetone, agentia and ethyl alcohol

Sichuan Xinxing Aluminium Co., Ltd.
Measurement of circulating water and deoxygenated water

Fujian Huaying Display Technology Co., Ltd.
Measurement of heavy oil, steam and circulating water

Nan'an Xiangsheng Valve Plant
Measurement of circulating water and high pressure water

Shandong Shouguang Juneng Special Steel Co., Ltd.
Measurement of circulating water and deoxygenated water

Nan'an Huatai Fire Protection Equipment Co., Ltd.
Measurement of circulating water and high pressure water

Anhui Jidu Wine Co., Ltd.
Measurement of ethyl alcohol, water and pure alcohol

Shanghai Steam-turbine Generator Limited Liability Company
Measurement of deoxygenated water, oxygen and engine oil

Yunnan Haiyan Waterproof Material Co., Ltd.
Measurement of asphalt, paint and coating

CNNC Jianzhong Nuclear Fuel Co., Ltd.
Measurement of natural gas, nitrogen and hydrogen

Xinjiang Tulufan Ruide Chemical and Light Industry Plant
Measurement of steam, circulating water and coal gas

Xinjiang Sing Horn Group Co., Ltd.
Measurement of circulating water and coal gas

Xiamen Teshui Group Co., Ltd.
Measurement of sewage and reductive water

SEC Shanghai Electric Machinery Co, Ltd.
Supporting measurement of deoxygenated water and 32# engine oil of turbine-generator

Shanghai Qunqiang Rubber Plastic Co., Ltd.
Measurement of circulating water and deoxygenated water Typical applications of Products

晋江恒丰皮革机械有限公司	循环水、酸剂计量
普耳机械(上海)有限公司	动力压缩机配套脱氧水计量
安徽应流机电集团股份有限公司	循环水、脱氧水计量
兖州煤业榆林能化有限公司	循环水、蒸汽、甲醇、半煤气计量
山西德力信电子科技有限公司	循环水、蒸汽、煤气计量
山西永鑫煤焦化有限责任公司	新鲜水、饱和蒸汽、煤气等计量
山东邹平铁雄焦化有限公司	新鲜水、饱和蒸汽、煤气、空气、氨水、洗油等计量
山东铁雄集团菏泽焦化有限公司	循环水、饱和蒸汽、煤气、氨水、洗油、甲醇等计量
黑龙江建龙钢铁有限公司	循环水、蒸气计量
长沙亦川机电设备科技有限公司	重油、混合液体计量
重庆煤科院测控技术研究所	矿井高压水计量
金冠（中国）食品有限公司	蒸汽、纯净水、二氧化碳、生物油计量
江西国宏化工有限公司	蒸汽、氯气、氮气、氢气、乙烯计量
南昌市长维乳品有限公司	植物糖、氢氧化钠液、二氧化碳计量
巴陵石化集团	工业污水、蒸馏水、重油、轻柴油计量
东风集团重型汽车有限公司	蒸汽、煤气、轻柴油、压缩空气计量
浙江巨化集团有限公司	溶融尿液、NHD溶液、蒸汽、水、煤气计量
上海路桥建设总公司路政设备有限公司	乳化沥青、改良性沥青计量
宁波万华聚氨酯有限公司	蒸汽等气体计量
重庆凯林制药有限公司	蒸汽、冷冻水计量
山西亚美大宁能源有限公司	瓦斯气计量
内蒙古源通煤化集团有限责任公司	同炉煤气、蒸汽、水、氨水计量
大连大化龙岛石化有限公司	反应液、烃、蒸汽馏水、甲醇计量
山西乾峰煤焦集团	蒸汽、洗油、笨、水计量
中盐榆林盐化有限公司	卤水、烧碱、白水计量
中粮天科生物工程（天津）有限公司	甲醇、酯化液、脂交换液、甲醇油计量
广州天赐高新技术有限公司	蒸汽、氮气计量
湖北省宏源药业有限公司	二氯甲烷、导热油计量
上海上电机电设备工程有限公司	46#透平油、自来水计量
山西和瑞新能源开发有限公司	瓦斯气计量
宁夏宝丰能源集团有限公司	苯、氮气、蒸汽、高压氨水、空气、煤气、洗油计量
华陆工程科技有限公司	氮气、蒸汽、循环水计量
神华蒙西煤化股份有限公司	空气、蒸汽、软水、煤气、洗油、苯计量

Jinjiang Hengfeng Leather Machine Co., Ltd.
Measurement of circulating water and antacids

Pu'er (Shanghai) Co., Ltd.
Supporting measurement of deoxygenated water of power compressor

Ahhui Yingliu Electromechanical Co., Ltd.
Measurement of circulating water and deoxygenated water

Yanzhou Coal Mining Yulin Energy& Chemical Co., Ltd.
Measurement of circulating water, steam, methyl alcohol and semi-coal gas

Shanxi Dekisen Electrical& Technology Co., Ltd.
Measurement of circulating, steam and coal gas

Shanxi Yongxin Coal Chemical Co., Ltd.
Measurement of fresh water, saturated steam, coal gas, etc.

Shandong Coking Group Co., Ltd.
Measurement of fresh water, saturated steam, coal gas, air, ammonium hydroxide, wash oil, etc.

Shandong Tiexiong Group Heze Coal-Chemical Co., Ltd.
Measurement of fresh water, saturated steam, coal gas, ammonium hydroxide, wash oil, methyl alcohol, etc.

Jianlong Steel and Iron Co., Ltd.
Measurement of circulating water and steam

Changsha Yichuan Mechanical & Electrical Equipment Science and Technology Co., Ltd.
Measurement of heavy oil and liquid mixture

Measurement and Control Technique Institute of Chongqing Coal Science Academy
Measurement of high pressure water in mine

Golden Delicious (China) Food Co., Ltd.
Measurement of steam, purified water, carbon dioxide and bio-oil

Jiangxi Guohong Chemical Co., Ltd.
Measurement of steam, chlorine, nitrogen, hydrogen, and ethylene

Nanchang Changwei Dairy Co., Ltd.
Measurement of plant sugar, sodium hydroxide solution, and carbon dioxide

SINOPEC Baling Petrochemical Branch
Measurement of industrial sewage, distilled water, heavy oil, and light diesel

Dongfeng Motor Group Heavy Duty Truck Co., Ltd.
Measurement of steam, coal gas, light diesel, and compressed air

Juhua Group Corporation
Measurement of melted urine, NHD solution, steam, water and coal gas

Road Administration Equipment Co., Ltd. of Shanghai Road & Bridge Construction Co., Ltd.
Measurement of emulsified asphalt and improved asphalt

Ningbo Wanhua Polyurethane Co., Ltd.
Measurement of steam and other gases

Chongqing Carelife Pharmaceutical Co., Ltd.
Measurement of steam and chilled water

Shanxi Yamei Daning Energy Co., Ltd.
Measurement of methane gas

Inner Mongolia Yuantong Coal Chemical Group Limited Liability Company
Measurement of furnace gas, steam, water and ammonium hydroxide

Dalian Dahua Longdao Petrochemical Co., Ltd.
Measurement of reaction liquid, hydrocarbon, steam distillation water and methyl alcohol

Shanxi Qianfeng Group Coal & Coke Co., Ltd.
Measurement of steam, wash oil, benzene and water

China Salt Yulin Co., Ltd.
Measurement of brine, caustic soda and tail water

COFCO Tech Bioengineering (Tianjin) Co., Ltd.
Measurement of methyl alcohol, esterification liquid, fat exchange liquid and methyl alcohol oil

Guangzhou Tianci High-Tech Materials Co., Ltd.
Measurement of steam and nitrogen

Hubei Hongyuan Pharmaceutical Co., Ltd.
Measurement of dichloromethane and heat transfer oil

Shanghai Shangdian Mechanical and Electrical Equipment Engineering Co., Ltd.
Measurement of 46# turbine oil and tap water

Shanxi Herui New Energy Development Co., Ltd.
Measurement of methane gas

Ningxia Baofeng Energy Group Co., Ltd.
Measurement of benzene, nitrogen, steam, high pressure ammonium hydroxide, air, coal gas and wash oil

Hualu Engineering & Technology Co., Ltd.
Measurement of nitrogen, steam and circulating water

Shenhua Mengxi Coal Chemical Co., Ltd.
Measurement of air, steam, soft water, coal gas, wash oil and benzeneFlowmeter Selection Guide

呼和浩特中燃城市燃气发展有限公司	蒸汽、氨水、洗油、苯、合成气、循环气、驰放气计量
内蒙古伊东能源化工股份有限公司	脱盐水、脱氧水、冷凝水、驰放气、蒸汽、水计量
古县利达焦化有限公司	焦炉气、脱盐水、蒸汽、栲胶液计量
山西光大焦化气源有限公司	甲醇、稀醇水、杂醇、水、冷凝水、蒸汽、脱盐水计量
宁波万华聚氨酯有限公司	蒸汽、脱盐水、尾气、氮气、一氧化碳计量
中海油新能源(海南)生物能源化工有限公司	油脂、重质油脂、导热油、甲醇计量
七台河乾丰能源股份有限公司	水、剩余氨水、脱硫液、蒸汽、洗油计量
七台河宝泰隆煤化工股份有限公司	剩余氨水、蒸氨废水、脱硫液、空气、蒸汽、洗油计量
南通生物能源蛋白饲料有限公司	毛油、蒸汽计量
浙江正和造船有限公司	天然气、二氧化碳、氧气计量
三明安然环保有限公司	氯水、污水计量
上海富重机械设备制造有限公司	油计量
河津市华晟能源有限公司	洗油、蒸汽、苯、水、蒸氨废水、压缩空气、蒸汽等计量
昆明钢铁集团有限责任公司	空气、蒸汽、二氧化碳、丙烷气、氧气计量
重庆博腾制药科技股份有限公司	蒸汽、冰盐水计量
中粮天科生物工程（天津）有限公司	酯化液、甲醇、脂交换液、DD油计量
天津渤海化工有限责任公司天津碱厂	杂醇油、甲醇、水、蒸汽计量
蒙古乌审旗世林化工有限责任公司	粗合成气、粗甲醇、锅炉给水、污水、酸气、燃料气、蒸汽、水计量
河南龙宇化工有限公司	CO2、氮气、酸性气、富甲醇、甲醇计量
陕西陕焦化工有限公司	煤气、饱和蒸汽、焦炉煤气计量
青岛市润邦化工建材有限公司	沥青计量
宜宾北方川安化工有限公司	水计量
江西省万安万江化工有限公司	蒸汽、二甲苯、甲醇、循环水计量
飞翔化工(张家港)有限公司	导热油、重油计量
江西省永泰化工有限公司	蒸汽、碳酸钠、邻苯二甲酸气计量
浙江新安化工集团股份有限公司	静水、蒸汽、氯硅烷、氯化氢计量
建滔（河北）化工有限公司	循环水、饱和蒸汽、煤气、氨水、洗油、甲醇等计量
新希望集团呼伦贝尔东能化工有限公司	循环水、煤气、氨水、甲醇、脱硫液等计量
江西华宇香料化工有限公司	松节油、蒸汽计量
广西成田生物化工有限公司	甲醇、糖料、乙醇计量
江西电化精细化工有限责任公司	PP液剂、三氯氢硅液、氯化亚砜计量
怀化市双阳林化有限公司	氢化尾气、氢气、氢化液、水、空气、工作液、稀碱计量

Hohhot Zhongran City Gas Development Company Ltd
Measurement of steam, ammonium hydroxide, wash oil, benzene, synthesis gas, recycle gas, and purge gas

Inner Mongolia Yidong Energy Chemical Industry Co., Ltd.
Measurement of demineralized water, deoxygenated water, condensate, purge gas, steam and water

Shanxi Guxian Lida Coking Co., Ltd.
Measurement of coke–oven gas, demineralized water, steam and tanning extracted liquid

Shanxi Guangda Coking Gas Co., Ltd.
Measurement of methyl alcohol, diluted alcohol water, fusel, water, condensate, steam and demineralized water

Ningbo Wanhua Polyurethane Co., Ltd.
Measurement of steam, demineralized water, tail gas, nitrogen and carbon monoxide

CNOOC New Energy (Hainan) Biological Energy Chemical Industry Co., Ltd.
Measurement of grease, heavy grease, heat transfer oil, and methyl alcohol

Qitaihe Qianfeng Energy Limited Liability Company
Measurement of water, surplus ammonium hydroxide, doctor solution, steam and wash oil

Qitaihe Baotailong Coal Chemical Industry Co., Ltd.
Measurement of surplus ammonium hydroxide, steamed ammonia wastewater, doctor solution, air, steam and wash oil

Nantong Bioenergy Protein Feed Cp., Ltd.
Measurement of crude oil and steam

Zhejiang Zhenghe Shipbuilding Co., Ltd.
Measurement of natural gas, carbon dioxide and oxygen

Sanming Anran Environment Protection Co., Ltd.
Measurement of chlorine water and sewage

Shanghai Fuzhong Mechanical Equipment Manufacturing Co., Ltd.
Measurement of oil

Hejin City Huasheng Energy Co., Ltd.
Measurement of wash oil, steam, benzene, water, steamed ammonia wastewater, compressed air, etc.

Kunming Iron & Steel (Group) Co. Ltd.
Measurement of air, steam, carbon dioxide, propane gas and oxygen

Porton Fine Chemicals Ltd.
Measurement of steam and brine ice

COFCO TECH BIOENGINEERING(TIANJIN) CO., LTD.
Measurement of esterification liquid, methyl alcohol, fat exchange liquid and DD oil

Tianjin Bohua Yongli Chemical Industry Co., Ltd. of Tianjing Bohai Chemical Co., Ltd.
Measurement of fusel, methyl alcohol, water and steam

Mongolia Uxin Banner Shilin Industry Limited Liability Company
Measurement of crude synthesis gas, crude methyl alcohol, boiler feed water, sewage, acid gas, fuel gas, stream and water

Henan Longyu Chemical Co, Ltd.
Measurement of CO2, nitrogen, acid gas, methyl–rich solution and methyl alcohol

Shaanxi Coke Chemical Co., Ltd.
Measurement of coal gas, saturated steam and coke oven gas

Qingdao City Runbang Chemical Building Materials Co., Ltd.
Measurement of asphalt

Yibin North Chuanan Chemical Co., Ltd.
Measurement of water

Jiangxi Wanan Wanjiang Chemical Co., Ltd.
Measurement of steam, xylene, methyl enzyme and circulating water

MFeixiang Chemicals (Zhangjiagang) Co., Ltd.
Measurement of heat transfer oil, and heavy oil

Jiangxi Yongtai Chemical Co., Ltd.
Measurement of steam, sodium carbonate and phthalic acid

Zhejiang Xinan Chemical Industrial Group Co., Ltd.(Wynca Group)
Measurement of still water, steam, chlorosilane and hydrogen chloride

Kingboard Chemical Holdings Ltd.
Measurement of fresh water, saturated steam, coal gas, ammonium hydroxide, wash oil, methyl alcohol, etc.

East Hope Hulunbeir Dongneng Chemical Industry Co., Ltd.
Measurement of circulating water, coal gas, ammonium hydroxide, methyl alcohol, doctor solution, etc.

Jiangxi Huayu Aromatic Technology Inc.
Measurement of turpentine and steam

Guangxi Chengtian Biochemical Engineering Co., Ltd.
Measurement of methyl alcohol, sugar and ethyl alcohol

Jiangxi Electrochemical Fine Chemical Co., Ltd.
Measurement of PP liquid, trichlorosilane liquid and thionyl chloride

Huaihua City Shuangyang Forest Chemical Co., Ltd.
Measurement of hydrogenated tail gas, hydrogen, hydrogenated liquid, water, gas, working solution and diluted base

_____流量计选型工况表

客户名称：

联系人：

电话：　　传真：

工况条件

测量介质：_____ □液体; □气体; □饱和蒸气; □过热蒸气; □混合气体;

公称通径_____mm　公称压力_____MPa　测量精度_____%

流体工况密度_____kg/m³　流体粘度: _____ Pa.s

流量范围：□m³/h;　□t/h;　□Nm³/h;　□L/h;　□kg/h　□L/m³

最小 _____ 正常_____ 最大_____

介质流速（m/s)：最小 _____ 正常 _____最大 _____

介质温度（℃)：　最小_____ 正常_____ 最大_____

介质压力（MPa)：最小 _____ 正常 _____最大 _____

流体方向: □→；□←；□↑；□↓；□其他方式: _____

仪表表头显示: □正面　□左侧面　□右侧面　□其他

流量计安装环境: □室内; □室外; □其他环境:

安装及环境条件

工艺管道外径:_____ 工艺管道内径:_____ 工艺管道材质:_____

安装形式：□法兰管道型　□对夹型　□管锥螺纹型　□插入型　□在线可伸缩型

管道振动：□振动可以忽略不计　□振动很强

直 管 段：　前直管段长度 _____　后直管段长度_____

测量管材质：□304　□316L　□内衬　□碳钢　□特殊要求 _____

结构形式：□一体型　□ 分体型，电缆长度为：_____(标配5米)

环境温度范围:_____ 环境其它条件:_____

防爆要求：　□非防爆　□隔爆　□本安

供电电源：　□ 220V(涡街、电磁选项) □ 3.6VDC □24VDC　□配置220VAC/24VDC电源适配器 □

信号输出：　□ 现场显示 □4～20mA　□HART协议　□频率脉冲　□RS485　□RS232　□其他要求_____

电极材质(电磁选项)：　□含钢不锈钢　□ 哈氏合金　□ 钛　□ 钽　□铂

衬里材质(电磁选项)：　□橡胶　□四氟　□PAT　□陶瓷

详细提供工况参数是确保流量计制造和适应工况的重要依据。

型号规格：　　订货数量：

选型人：

日期：　　确认人：

电话:(0595)22421111　22455868　传真:(0595)22422299

Working condition table for flowmeter selection

Name of customer:

Contact:

Tel: Fax:

工况条件无译文

Measured medium:_____☐Liquid0; ☐Gas; ☐Saturated steam; ☐Superheated steam ☐Gas mixture;

Nominal diameter:_____mm, Nominal pressure:_____KPa Accuracy of measurement_____%

Working density of fluid:_____kg/m³ Fluid viscosity:_____Pa.s

Flow range: ☐m³/h; ☐t/h; ☐Nm³/h; ☐L/h; ☐kg/h ☐L/m³

Minimum_____ Normal_____ Maximum_____

Medium velocity (m/s): Minimum_____ Normal_____ Maximum_____

Medium temperature (℃): Minimum_____ Normal_____ Maximum_____

Medium pressure (Mpa): Minimum_____ Normal_____ Maximum_____

Fluid direction: ☐→; ☐←; ☐↑; ☐↓; ☐Other manner : _____

Instrument meter display: ☐Front ☐Left side ☐Right side ☐Others

Installation environment of flowmeter: ☐Indoor; ☐Outdoor; ☐Other environment environments:

Installation and environmental conditions

External diameter of process pipeline: _____ Internal diameter of process pipeline:_____Material of process pipeline:_____

Flange manner: ☐Flange pipe type ☐Wafer type ☐Taper pipe thread type ☐Insert type ☐Online telescopic type

Pipeline vibration: ☐Vibration is negligible ☐Strong vibration

Straight length: ☐front straight length ☐Rear straight length

Material of measuring pipe: ☐304 ☐316L ☐Lining ☐Carbon steel ☐Specific requirement_____

Structure: ☐Integrated type ☐Separate type, cable length: ____ (standard: 5 m)

Ambient temperature scope:_____Other conditions in environment:_____

Explosion-proof requirements: ☐Non-explosion-proof ☐Explosion-proof ☐Intrinsic safety

Power source: ☐220V (vortex street, electromagnetic type options) ☐3.6VDC ☐24VDC ☐Configured with 220VAC/24VDC power adapter

Signal output: ☐Site display ☐2~20mA ☐ HART protocol ☐Frequency pulse ☐RS485 ☐RS232 ☐Other requirements_____

Electrode material (electromagnetic type option): ☐Indium stainless steel ☐Hastelloy ☐Titanium ☐Tantalum ☐Platinum

Lining material (electromagnetic type option): ☐Rubber ☐PTFE ☐PAT ☐Ceramic

Detailed provision of parameters in working conditions is a key basis for ensuring manufacture of flowmeter and meeting working conditions.

Model specification:

Selected by:

Date:

Order quantity:

Confirmed by:

Tel: 86-595-22421111 22455868 Fax:86-595-22422299